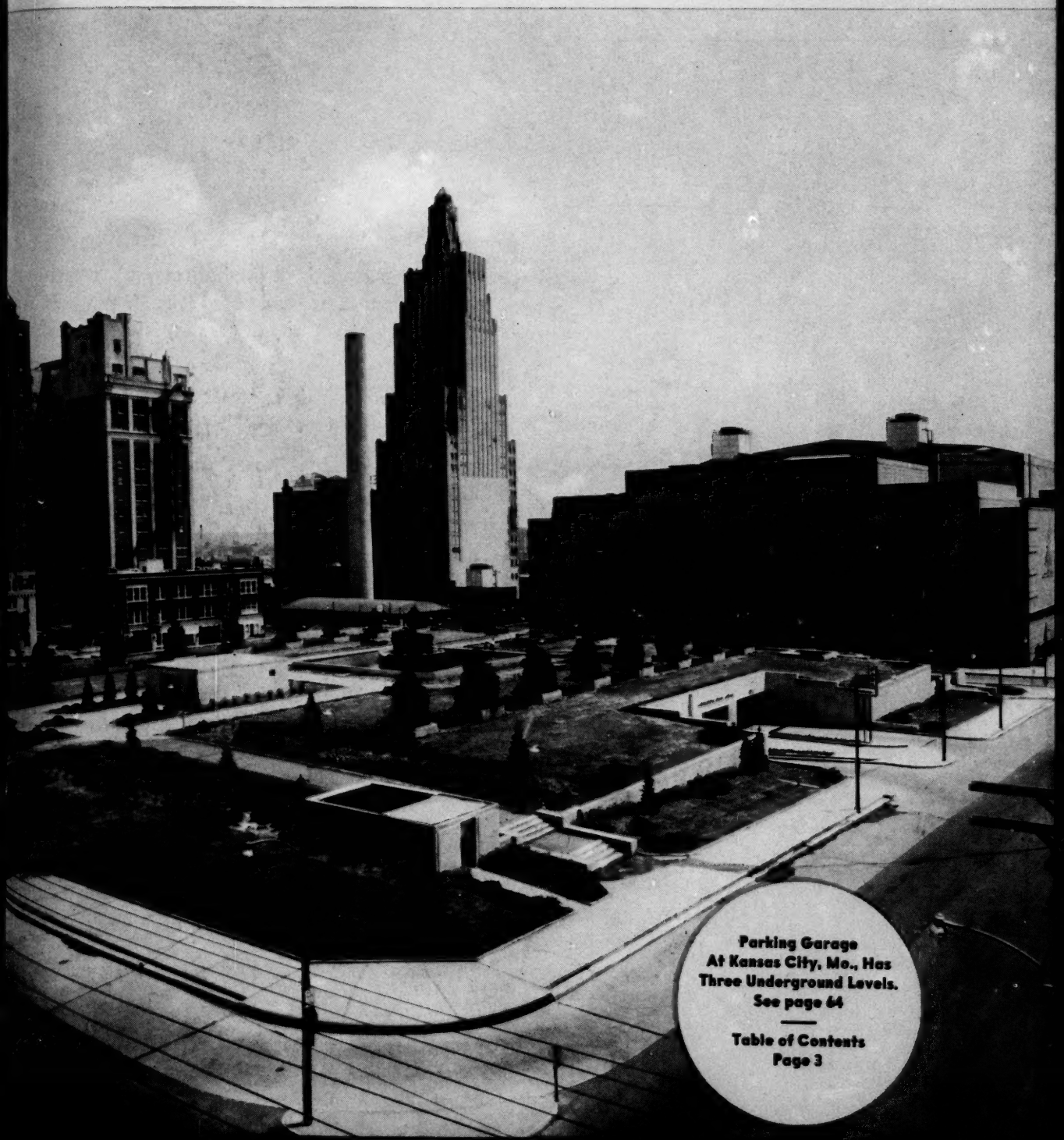
AIR CONDITIONING HEATING AND VENTILATING

MARCH, 1958—55th Year



Parking Garage At Kansas City, Mo., Has Three Underground Levels.
See page 64

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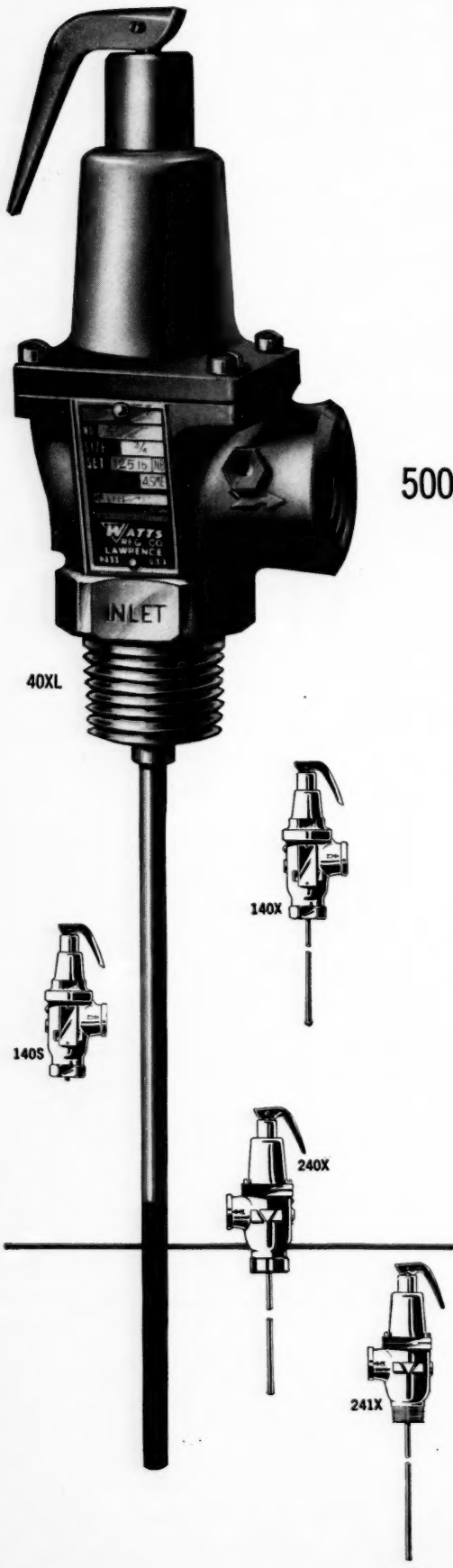

New
A.S.M.E., A.G.A. rated T&P Relief Valve an outstanding value

500,000 BTU/HR capacity meets all domestic and many other needs

Highest possible value is built into this new Watts automatic reseating type temperature and pressure relief valve. In fact, no other valve of equal quality or capacity is available at such an attractive price.

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Write for complete information or see your wholesaler.

Watts Regulator Company, Lawrence, Massachusetts

Be on the safe side with

WATTS

Protection and Control Specialties

Why Every Steam Heated Unit Needs its Own Steam Trap

. . . the theory, practice and proof of "unit trapping" for top temperatures

Using an individual trap for each steam heated unit, including each separate coil, chest or chamber of a machine—pays off for the user.

Here are just two examples:

1. On a creamery dryer

Drainage Method	*Air Temperature*
Restricted Blow-thru	250°
Group trapping (1 trap for 8 coils)	225°
Armstrong Unit Trapping (8 traps—1 for each coil)	**309°**

2. On a platen press

Drainage Method	*Processing Time*
Restricted Blow-thru	50 minutes
Group Trapping	35 minutes
Armstrong Unit Trapping	**25 minutes**

Why Unit Trapping Works Best

It is reasonable to assume that no two steam heated units will have *identical* condensing rates. Even the slightest difference in rate will cause a difference in steam pressure drops through the units. Here's where the trouble starts. Condensate from each unit may flow to the trap. But, what about air and other non-condensibles in the system? A difference in pressure drops too small to be indicated by an ordinary pressure gauge will permit backflow of steam from the higher pressure units to the lower pressure units. This backflow of steam may even impede flow of condensate from the lower pressure unit to the trap . . . and it will definitely impede or block off flow of air to the trap. The result is sluggish heating, reduced temperatures, reduced output, fuel waste and increased possibility of corrosion. Figures 1, 2 and 3 diagram the action.

Unit Trapping Not Costly

No engineer wants any more mechanical devices in his plant than are absolutely necessary. But, the moderate additional cost of using two or more small traps, instead of one big one, is saved over and over again in improved efficiency.

If the traps are Armstrong, maintenance is no problem. And users frequently tell us that Armstrong traps outlast others two and three to one.

Steam traps usually represent a fraction of 1% of the cost of the equipment they drain. Does it make good sense to lose 10% or more of equipment capacity to save a few dollars on traps?

Why not test Armstrong unit trapping in your plant. If you are not completely satisfied with the results you can return the traps for a full refund of the purchase price. There is little to lose—lots to gain. Call your local Armstrong Factory Representative or Distributor, or write **Armstrong Machine Works, 8463 Maple St., Three Rivers, Mich.**

ASK FOR the 44-page Steam Trap Book and reprint of article on Unit Trapping.

801ST

ARMSTRONG STEAM TRAPS

How Different Condensing Rates Can Slow Production

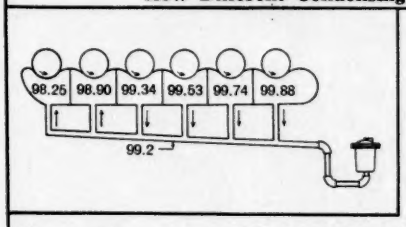


Fig. 1 This is a 6-roll ironer shortly after it has begun operating on 100 psi steam. When cold, wet material passes over chest 1, steam condensing rate is high and pressure drops accordingly. The pressure drop in chest 2 will not be as great, and so on down the machine as the material becomes progressively hotter and drier. Average pressure in the chests then is 99.27 lbs., and drain header pressure is slightly less, about 99.2 lbs. Under these conditions, steam from drain header enters chests 1 and 2 (as indicated by arrows at side of drain lines) because of pressure difference. Though condensate from chests drains by gravity, air can't leave chests countercurrent to incoming steam. Fig. 2 shows what happens next.

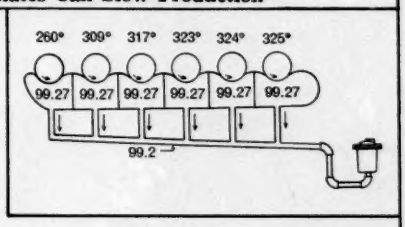


Fig. 2 This is the same 6-roll ironer after it has been operating a while. Air has accumulated in chests 1 and 2, reducing condensing rate and decreasing pressure drop. This process repeats itself down the line until pressures are as shown—that is, enough air will accumulate in each chest so that condensing rates and pressure drops of all chests will be about equal. The net result is shown in chest temperatures which are actual pyrometer readings taken on a 6-roll ironer, drained by a master trap, in a Chicago laundry. The laundry was making 337.9°F steam, but getting an average of only 309.6°F from the ironing surfaces, necessitating slow operation and frequent reruns. Then they tried Armstrong unit trapping—see Fig 3.

How Unit Trapping Prevents Trouble

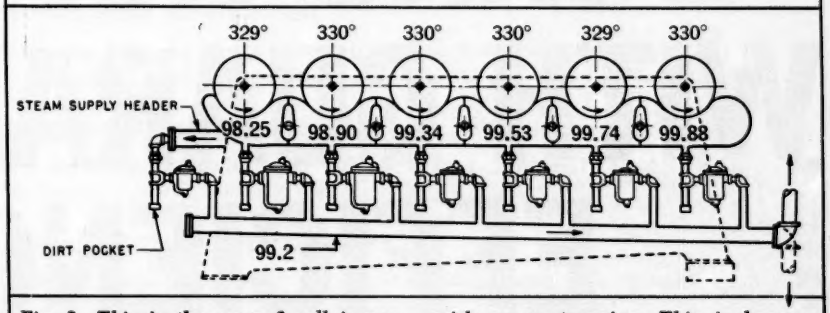
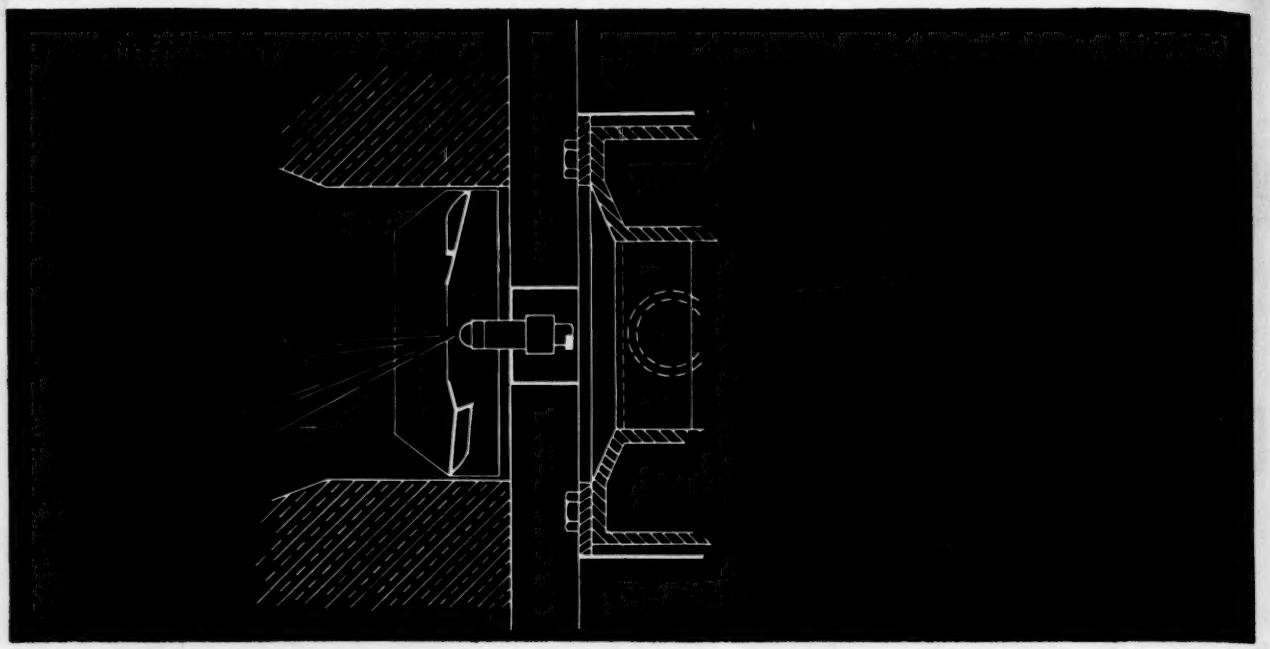


Fig. 3 This is the same 6-roll ironer, now unit trapped. Temperatures shown are also actual pyrometer readings—the average of 329.6°F is 20° higher than with group trapping. This is because air is continually removed from each chest into the drain header, and cannot get back into any chest.



NEW PYROJET BURNS NO. 5 OIL WITH GUARANTEED EFFICIENCY

If your facilities are designed for No. 5 oil, Dravo's new *Counterflo* Space Heater with PYROJET burner will handle all grades of No. 5 oil efficiently and dependably. The dual pre-heating system brings hot oil out to the tip of the nozzle. Simplified electric ignition system provides smooth, dependable starts. With burner efficiency guaranteed for all grades of No. 5, a new level of heating economy is available.

Dravo Space Heaters with induced draft PYROJET burner are also available in gas or gas/light oil burning models. New stainless steel air-foil combustion chamber raises heat transfer efficiency. Ask your Dravo representative for expert advice on your heating problem, or write Dravo Corporation, Dravo Building, Pittsburgh 22, Pa.

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AIR CONDITIONING HEATING AND VENTILATING

Volume 55, Number 3 **March, 1958**

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HIGH SPOTS

• Extension by the Engineers Joint Council, New York, N. Y., of its policy of seeking unity in the engineering profession is seen in a report to the president of EJC by its Committee on International Relations discussing assistance in the organization of a **Federation of Engineering Societies among nations of the Pacific and Far East.** Such a federation, of which EJC would be a member, tentatively includes United Technological Organization (Philippines), Institution of Engineers (India), Japanese Federation of Engineering Societies, Institute of Engineers (Pakistan), Institution of Engineers, (Australia), Council of New Zealand Institute of Engineers, and Association of Engineers (Burma).

• The American Society of Heating and Air-conditioning Engineers and the American Society of Refrigerating Engineers will present their memberships with a **merger** proposal shortly. See News of the Month, page 119.

• **A new tractor-trenching device** that digs trenches for sub-surface drainage systems, forms pipe from a plastic sheet, and backfills the hole will be among the recent developments introduced to members of the Building Research Institute at their Seventh Annual Meeting to be held at the Shoreham Hotel, Washington, D. C., April 21-23. William H. Scheick, executive director, reports that pipe can be laid by this system at a quarter of the cost of current methods. Developed by the U. S. Department of Agriculture, it also makes possible the reclaiming of swampy, marginal land for development purposes. During the 3-day annual meeting, members of BRI and guests from the building industry and related professions will participate in a diversified technical program covering future economic and population trends, fire protection of buildings, world-wide trends in building research, and a review of new materials.

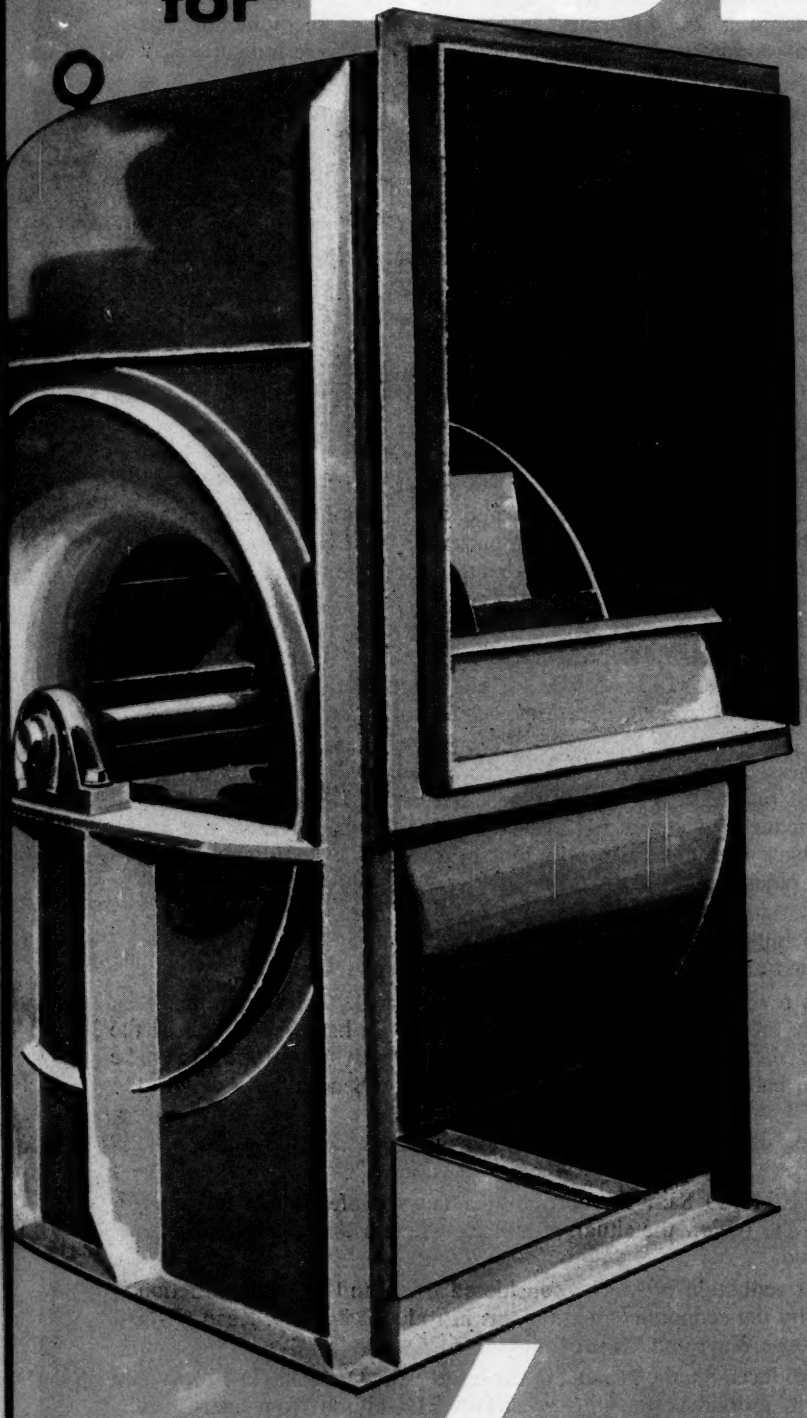
• Also at the BRI meeting, John I. Yellott, executive director of the Association for Applied Solar Energy, will analyze ten years of research on solar energy and improved design concepts that are said to make practical today the **heating of homes by the sun's rays in more northerly latitudes.** He will describe a test home now under construction in Phoenix, Ariz., which will be heated and cooled by solar energy. Following his talk, Mr. Yellott will be quizzed by a panel of mechanical engineers and architects on the future of solar heating and the ways in which home design and construction should be modified to utilize its potential.

• A financial contribution to California State Polytechnic College by Western Air Conditioning Industries Association, Los Angeles, Calif., will permit the college to disseminate, to schools of pre-college level and to those preparing for college, accurate information on the **opportunities offered by the air-conditioning and refrigeration fields.** While not as much in the public eye as satellites, missiles, and electronics, the Cal Poly administration believes that the air-conditioning industry is "a growing giant" and that the fact is often overlooked that a wide variety of types of engineering is involved, covering the full range of professional activity.

The BIG year for

BIG

performance



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WASHINGTON OVERTONES

by LORING F. OVERMAN

● Weeks after assembling for its second session, the 85th Congress was still busy with legislative preliminaries. Hearings, investigations, and recommendations by committees and sub-committees made the headlines. There were indications, however, that the pace would quicken sharply in the weeks just ahead.

Principal overtones came from Army's Explorer satellite, and from the faltering economy.

Explorer's effect on Washington was almost magical. Sputnik-bowed heads were raised again. Military shoulders were squared. Official Washington, again assured that "we can do it", started making new plans to do it better.

The frustrated sense of urgency seemed to disappear. In the Department of Defense big things were being planned, but on more of a business as usual basis.

● Less assured was the increasing emphasis placed upon efforts to brake the receding economy. Proposals range from pump-priming through a multi-billion dollar program of post office and federal building construction, to a four-billion dollar cut in income taxes.

Possibility of a tax cut had not been conceded as long as the Red Sputniks monopolized outer space.

Currently, with the Sputniks chaperoned, and with a month of tax testimony recorded by the House Ways and Means Committee, there is a cautious acceptance of the idea that tax relief for both individuals and corporations may be necessary to restore investment incentive and stimulate the economy.

Favored in much of the testimony before the committee were House Resolutions 6452 and 9119, introduced by Representatives Sadlak (R. Conn.) and Herlong (D. Fla.) respectively. These bills provide for a series of annual reductions in tax rates for both individuals and corporations, leading ultimately to a top rate of 42% for both.

Of the 282 witnesses who appeared before the committee, many favored special tax relief for small business. This is provided in the Curtis Bill (HR 5735). It would authorize deductions yearly of 20% or $30,000, whichever is the lesser, for sums plowed back into the business, either in inventory or equipment. Provision for deferred payment of estate taxes involving closely held businesses was favored.

Another pair of bills (HR 9 and HR 10) would allow self-employed persons a deduction for limited amounts placed in their own retirement systems.

Writing of a tax revision bill is not expected before April. Thus committee staff people may analyze the testimony; committee members will have time to check the temperature of the recession; and constituents will have an opportunity to make their wishes known before proposals reach the House and Senate floors.

● Meanwhile, three other actions permit limited optimism regarding the outlook for tax cuts:

—Speaker of the House Sam Rayburn told a news conference that Congressional leaders plan "to review the situation and see where a tax cut, if there is one, will do the most good."

—A standby tax reduction bill to be considered when and if a tax reduction is deemed necessary by the economic situation was introduced by Rep. Kean (R-NJ), a member of the House Ways and Means Committee.

—Two bills introduced in the Senate by Senator Paul Douglas (D-Ill.), would trim $3-billion from individual income taxes, and $1.4-billion from excise taxes. Included in the list of excises eliminated are mechanical refrigerators, quick-freeze units, and air conditioners.

(Continued on page 8)

VAPOR HAS CAUSED MORE DAMAGE THAN FLOODS!

Like a cancer, the growth of the fungus which causes timber rot, *continuously* undermines the "health" of the house. This growth is promoted by condensed vapor. Condensation also promotes peeling paint, stained plaster, damaged mortar and masonry, warped flooring. More aggregate damage has been caused to buildings by vapor than by floods.

Normal living routines in a home; washing, drying, cooking; or the presence of many people breathing and perspiring in markets, churches, theatres, create large quantities of vapor. When warm, vapor-laden air touches cold inner surfaces of roofs and exterior walls, much of it condenses, and causes damage.

How can the flow of vapor into wall and ceiling spaces be retarded? How can one accelerate the escape of evaporation of driven rain, leaks, dampness, and other water from building spaces?

CONTINUOUS VAPOR BARRIER OF METAL

A simple answer has been found by many architects and builders. Exterior walls and roofs, compared with almost *impervious metal*, have greater vapor permeability than the required minimum 5 to 1 ratio. When vapor pressures build up in wall and ceiling spaces, the vapor flows out (harmlessly), following Nature's Law that gases flow from areas of greater density to those of less density. It cannot back up through *impervious, continuous* metal.

Scientific continuous, multiple aluminum and air spaces also minimize condensation formation; and drastically retard heat as well as vapor flow.

Have you read the U. S. NATIONAL BUREAU OF STANDARDS brochure: "Moisture Condensation in Building Walls"? It discusses vapor and heat flow, and gives vital facts on the causes and prevention of condensation. If you use the coupon, you'll get a copy at our expense.

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TYPE 4	C .105=3⅛"	C .042=8"	8¢ sq. ft.
TYPE 5	C .081=4"	C .034=9⅛"	10¢ sq. ft.
TYPE 6	C .068=4⅛"	C .034=9⅛"	11¢ sq. ft.

*Determined by method of National Bureau of Standards in H.H.F.A. Research Paper 32.
†Calculated on basis of limiting thermal values cited in Fed. Specs. LLL-f-321b; HH-I-585; HH-I-521c; HH-I-551a.
‡Approximate cost, material and labor, new construction between wood joists.

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WASHINGTON OVERTONES *(Continued from page 6)*

● Of equally direct interest to air conditioning, heating and ventilating people are proposals for a $2-billion dollar modernizing and replacement plan for post offices. Plan calls for a three to five year program involving 2,500 government-owned post office buildings, 12,000 leased buildings, and the procurement of modern mail-handling equipment.

Government would spend $175-million a year for modernization, and private funds $1.5-billion during the life of the program, for lease-purchase projects.

● Air-conditioning of all federal buildings in Washington, D.C., has also been mentioned as under study. While only a regional project, the public relations value of such a move should not be underestimated.

Plans of the Capital City's transit system to purchase more than 100 new air-conditioned buses should be viewed in the same light.

● Private home building starts during January were at the seasonally adjusted annual rate of 1,030,000. The total of 69,000 starts was 11% above December and 10% above January of last year. The pickup was primarily in the South and West.

● Recently enacted Public Law 85-321, (February 11, 1958), gives the Internal Revenue Service greater power to collect from employers who fail to turn over to the Government taxes withheld from employees, or excise collected from customers. IRS may require deposit of such taxes in a special trust account for the United States Government. Failure to comply makes the violator subject to a $5000 fine, or a year's imprisonment, or both.

● International Cooperation Administration's Office of Small business, in a memo to small manufacturers, tells how to share in overseas business under the Mutual Security Program. Says the memo, in part: "On ordinary industrial commodities alone—not including those for specific projects or for agricultural commodities—American firms received business amounting to over $194,000,000 from July 1, 1956 to June 30, 1957. Did you try to get any of this business? Or were you unaware of its existence?"

For information write International Cooperation Administration Office of Small Business, Washington 25, D.C.

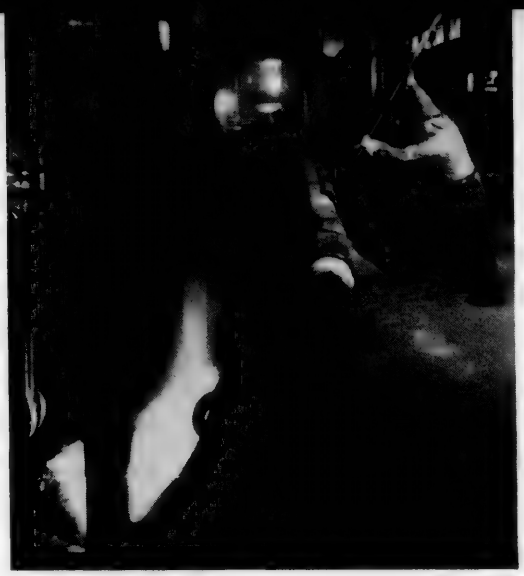
● Veterans of World War II have only a few months to qualify for home loans under the GI bill, which is not expected to be extended. Deadline for receiving applications is July 25, 1958.

● Two recent news releases are causing comment in Washington:

—One predicts that Florida hotels, motels, etc., will be required by state law to provide heat next year.

—Another proposes a $50-million organization to investigate whether it is possible to control the weather. Proposal was made by the Advisory Committee on Weather Control. The committee has been studying the problem for two years under auspices of the National Academy of Sciences. The report conceded some small scale successes in weather control through techniques such as cloud-seeding. Five-point program proposed includes increased weather research programs in universities and through scholarships and grants.

At last, it appears, "somebody's going to do something about the weather".



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Now—from Byers Research—an even better Wrought Iron for modern corrosion control—

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Out of the laboratory and into production comes a newly formulated Wrought Iron to strengthen man's arsenal of corrosion resistant weapons.

New 4-D Wrought Iron is at least 25% *more* corrosion resistant than standard Wrought Iron—long an industry standard for superior corrosion resistance. This significant metallurgical advance is the result of 17 years of continuing research by Byers metallurgists.

And here's what it means to you.

Seventeen-year in-service and laboratory tests prove that 4-D Wrought Iron is superior not only to standard Wrought Iron, but has much greater corrosion resistance than other materials which are sometimes offered as substitutes. Thus, the economy of using standard Wrought Iron can now be compounded through the use of new 4-D Wrought Iron.

In addition to increased corrosion resistance, new 4-D Wrought Iron has greater uniformity and improved physical and mechanical properties. This is attained by substantially increasing the deoxidation of the base metal, increasing its phosphorous content, and using a more siliceous slag.

And the price of new 4-D Wrought Iron? No increase. Despite higher production costs, the price of Wrought Iron will remain the same.

Write us for new 4-D Wrought Iron literature, or contact the Byers representative for complete details. A. M. Byers Company, Clark Building, Pittsburgh 22, Pa.

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BRIEFLY STATED

WITH THE ENGINEERS AND CONTRACTORS—Advancement of Richard E. Judd and Stanley R. Osborne from senior engineers to partnership is announced by HUBBARD, LAWLESS & BLAKELEY, consulting engineers of New Haven, Conn. and Boston, Mass. They design the mechanical, heating, air conditioning, plumbing, and electrical systems for industrial, institutional, school, and other type commercial buildings. Both of the new partners have had complete responsibility for the designs for 21 and 10 years respectively, and are professional engineers . . .

George A. Bryant, since 1940 president of THE AUSTIN CO., Cleveland, Ohio, engineer and builders, has been elected chief executive officer. Allan S. Austin, who has been vice-president for sales, succeeds him as president. The new executive vice-president and general manager is Harold A. Anderson, while Harold A. Hallstein becomes vice-chairman.

NAME CHANGE—Novelty Steam Boiler Works, Inc., Baltimore, Md., a subsidiary of Ellicott Machine Corporation, has been renamed ELLICOTT FABRICATORS, Inc. The company has specialized in the production of pressure vessels and special metal fabrications for over 50 years and became affiliated with Ellicott in 1953. The new name is considered more descriptive of its expanding scope of operations.

WITH THE INSTITUTES AND ASSOCIATIONS—Henry J. Couch is appointed executive secretary of VENTILATION & AIR CONDITIONING CONTRACTORS ASSOCIATION OF CHICAGO. He has been the Chicago district manager for Connor Engineering Corporation, and had been in the Chicago office of American Air Filter Company for 18 years . . . George F. Connelly was re-elected president of PLUMBING CONTRACTORS ASSOCIATION OF CHICAGO for another year. He heads his own plumbing contracting firm, G. F. Connelly Co., Inc. . . . Lyle M. Reading, president, Thomas B. Moore, vice-president, and Frank C. Richards, secretary-treasurer, head up the Michigan chapter of THE AMERICAN SOCIETY OF SANITARY ENGINEERING for the coming year . . .

The fifteenth product section of AIR-CONDITIONING AND REFRIGERATION INSTITUTE is formed. Headed by Henry O. Kirkpatrick of American Mfg. Co., a division of Standard Forge & Axle Co., Inc., it is called Mobile Air-Conditioning and Refrigeration Section. It was formed after a series of meetings of manufacturers of refrigeration equipment for trucks, trailers, and railway cars. Manufacturers of automotive air conditioning equipment, as such, will probably be included later . . . John I. Yellott has resigned as an assistant director of STANFORD RESEARCH INSTITUTE to devote full time to his duties as executive director of the ASSOCIATION FOR APPLIED SOLAR ENERGY, Phoenix, Ariz., a non-profit public service institution originally started with the assistance of Stanford, now independent . . .

Karl E. Johnson is the new president of COOLING TOWER INSTITUTE, Palo Alto, Calif., for 1958. He is vice-president of J. F. Pritchard & Co. of California, whose headquarters are in Kansas City, Mo. Others elected were: Vice-president—Denis O'Neil, Foster Wheeler Corporation; Secretary—Forrest B. Reed, The Marley Company; and Treasurer—Ennis C. Smith, Hudson Engineering Corporation.

BURGEONING BUSINESS—A. J. Vekony is appointed manager of a new direct factory sales office in Cleveland, Ohio, of JOHN J. NESBITT, INC., Philadelphia, Pa. He will handle distribution of the complete line of commercial and industrial heating, ventilating, and air conditioning equipment . . . Malcolm L. Moore is taking over a new sales office in Minneapolis, Minn., of the SPORLAN VALVE CO., St. Louis, Mo. . . .

NATIONAL CYLINDER GAS CO., Chicago, Ill., has been organized into seven divisions, each with its own president and operating organization. Four new divisions are established: NCG Div., Chicago, Ill., with J. L. Adank, president; Girdler Construction Division, Louisville, Ky., with W. Roberts Wood, president; Girdler Process Equipment Division, Louisville, with John E. Slaughter Jr., president; and Chemical Products Division, Chicago, with Walter H. Girdler, Jr., president. Three of the company's divisions continue as now constituted: Tube Turns, in Louisville, with John G. Seiler, president; Pennsylvania Forge Company, Philadelphia, Pa., with James S. Kerwin, president; and Perforating Guns Atlas Corp., Houston, Tex., with Paul J. Charrin, president . . .

INDUSTRIAL COMBUSTION, INC., Milwaukee, Wis., a newly formed manufacturing company in the commercial-industrial oil and gas burner field, has acquired facilities of the former Burner Division of Cleaver-Brooks Co., Milwaukee, Wis. J. Verne Resek, who in the past has managed this Division, has the majority stock in the new company and is president. He is also national president of Oil Heat Institute of America. A new plant and engineering laboratory, in Monroe, Wis., should be ready for occupancy this month, the company announced.

NEW SHOOTS—General Equipment Sales, Inc., El Paso, Tex., will sell the complete line of oil and gas fired units manufactured by DRAVO CORP., Pittsburgh, Pa. The territory includes 6 Texas and 12 New Mexico counties . . . John Madden of Boston Draft Control Co., Boston, Mass., is appointed to represent PETROMETER CORP., Long Island City, N. Y., in the New England area. He will handle the company's line of fuel oil and industrial liquid depth indicators, safety clean-out valves, and control accessories. Richard Stolley and H. P. Orlegeke, of Stolley & Orlegeke, Chicago, Ill., are the company's new Chicago representatives, as are Morgan Ricks and Bob Owen, of Ricks-Owen & Co., Houston, Tex.

The following will sell and install packaged air conditioning equipment in their respective areas for THE TRANE CO., La Crosse, Wis.: Apex Air Conditioning Corp., New York City; Midway Heating & Air Conditioning Co., Inc., Marietta, Ga.; Parker Heating and Air Conditioning Co., Atlanta, Ga.; Hall Sheet Metal Co., Claremore, Okla.; and Scranton Electric Construction Co., Inc., Scranton, Pa.

(Concluded on page 12)

And in Peru—A FUTURE OF FAULTLESS SERVICE

ATLAS BUILDING
Lima, Peru

JOSE ALVAREZ CALDERON
architect

FLOREZ & COSTA
engineers and builders

UNIVERSAL-RUNDLE CORPORATION
plumbing fixtures manufacturer

In striking contrast to the rugged mountain ranges surrounding Lima, the magnificent new Atlas Building provides an ancient South American city with a shimmering contemporary structure faced in glass and metal. For this quality project, DELANY diaphragm type flush valves traveled overseas to insure the dependable performance and minimized maintenance demanded by projects of stature. Many factors contribute to the expanding international renown of DELANY flush valves; up-to-date engineering, a broad and varied line, superb service, and a company reputation for excellence dating back to 1879. Add the plus factors and decide on DELANY . . . "the fastest growing name in flush valves!"

EXTERNAL ADJUSTMENT . . . ONE MORE REASON WHY DELANY FLUSH VALVES LEAD THE FIELD IN DESIGN AND DEVELOPMENT

The external adjustment of Delany Flush Valves is just one more example of the outstanding product design that's causing more and more plumbing men to switch to Delany. Instant on-the-job regulation of the flushing cycle is accomplished with only a twist of a screwdriver. Valve remains on line . . . no need to even turn off the water supply. Saves the installer's time . . . decreases owner's water consumption.

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IN CANADA: THE JAMES ROBERTSON CO. LTD.

DELANY *Flush* VALVES

SINCE 1879

BRIEFLY STATED

(Concluded from page 10)

AMONG THE MANUFACTURERS' PERSONNEL—Samuel F. Shawhan succeeds Ronald N. Campbell, who resigned, as president of BRYANT MFG. CO., Indianapolis, Ind., a Carrier division. The Kentucky Colonel has been assocated with Carrier since 1929 . . . R. O. McGary, senior vice-president of BUENSOD-STACEY, INC., will transfer from Charlotte, N. C., this Spring to company headquarters in New York and will assume executive responsibility for overall company planning . . .

Lewis J. Cox, executive vice-president, was elected president of IRON FIREMAN MFG. CO., Cleveland, Ohio, and Joseph J. Decker is appointed president of AMERICAN-STANDARD AIR CONDITIONING DIV., New York, N. Y. . . .

William P. Chapman will assume new duties in the research and development laboratory of JOHNSON SERVICE CO., Milwaukee, Wis., in his new capacity as administrative director. With the company's engineering staff since 1956, and formerly associated with National Tube Div., United States Steel Corporation, he has written many articles on radiant heating and snow melting for this magazine. Otto Scharpf was appointed technical director of research and development. He has been on the company's engineering staff since 1930 . . .

The following appointments were announced by YORK CORP., York Pa., subsidiary of Borg-Warner Corporation: David H. Crawford, sales manager of Commercial Air Conditioning; Winston W. Salmond, manager of the Southern District; E. John Berlet, Jr., manager of the North Atlantic District; Fred C. Wood, manager of the Central District; Marvin M. Crout, manager of Engineered Machinery; Wilbur S. Miller, sales development manager; Charles P. Strickland, manager of the Southwest District; Theodore Y. Davis, manager of the Middle Atlantic District; Christian J. Schurman, manager of Pacific District; and William T. Goldsmith, sales manager of residential air conditioning and heating . . .

Gordon F. Thruelsen is appointed general sales manager of FARR CO., Los Angeles, Calif. He was general manager of Dust Control, Inc., a company subsidiary, as well as the company's Southern California sales and certified filter service representative. He will be in charge of all marketing operations for the commercial-industrial, railroad, and electronic sales divisions . . . Donald A. Drake is promoted to Southwestern district manager for TUBE TURNS PLASTICS, INC., Louisville, Ky. With headquarters in Houston, Tex., he will supervise growing sales of PVC pipe to industry . . .

Frank K. Platt has relinquished his affiliation with AIR ENGINEERING CO., Kalamazoo, Mich., where he was president, to become central regional manager, a newly-created post, for all products of AMERICAN AIR FILTER CO., Louisville, Ky. He was succeeded at Air Engineering by L. B. Mason . . . New head of GENERAL MOTORS RESEARCH STAFF'S PHYSICS AND INSTRUMENTATION DEPARTMENT is Dr. Gerald M. Rassweiler, following retirement of Dr. Edward J. Martin, first physicist hired by General Motors. . . .

Robert Lee Boyd, Jr., has joined the CHROMALOX COMMERCIAL SPACE HEATING DIV., EDWIN L. WIEGAND CO., Pittsburgh, Pa. He has been associated with Westinghouse, Chrysler, and Electromode . . . William B. Firman is appointed marketing manager of ORR & SEMBOWER, INC., Reading, Pa. . . . William O. Brown, manager of the West Coast sales district of CRANE CO., Chicago, Ill., has been appointed general sales manager with headquarters at the general offices . . . Karl Koons is a new sales representative for JACKSON & CHURCH DIV., YORK-SHIPLEY, INC., York, Pa. He will be responsible for sales in Ohio, Western New York, Western Pennsylvania, and West Virginia . . .

Five changes in headquarters staff are announced by POWERS REGULATOR CO., Skokie, Ill.: Horace W. Fea, formerly advertising manager, becomes advertising director; Earl R. Bowman, formerly sales promotion manager, becomes advertising manager; Carl A. Gustafson adds the title of product manager for temperature control systems to his present responsibility as technical service manager; James J. Atkinson, formerly applications engineer, becomes product manager for plumbing and heating products; and Robert W. Clark, formerly applications engineer, becomes manager for industrial process controls . . . Robert L. Winter is appointed new products analyst for PITTSBURGH CORNING CORP., Pittsburgh, Pa. . . .

Terry J. Allen, new sales engineer for SPORLAN VALVE CO., St. Louis, Mo., will work with Jack Daniels out of the Cincinnati office . . . KOCH ENGINEERING CO., INC., Wichita, Kan., announces appointment of Bill T. Lindsey as sales manager and Earl H. Schreiber as sales engineer for its Cooling Tower Division . . . J. L. Fitzgerald is the new branch manager of THE POWERS REGULATOR CO., Skokie, Ill., in San Francisco. The move is from Seattle, Wash. His counterpart in Baltimore is Ralph Schoverling, who succeeds W. I. Collier, retiring after 40 years with the company . . .

Six members of its Waterbury Mfg. Co. division sales staff have been transferred to the Mill and Warehouse sales organization of CHASE BRASS & COPPER CO., Waterbury, Conn.: Thomas J. Marshall, Kenneth A. Irons, Joseph F. Kenney, Malcolmn K. Palmer, William Putich, and Xavier J. Galgota.

• Frank X. Gilg, 57, an executive assistant in the Boiler division of THE BABCOCK & WILCOX COMPANY, died suddenly after a heart attack on January 26. His widow, Mrs. Helen Tatnell Gilg, suffered a heart attack eight hours later and succumbed in her home on January 27. Mr. Gilg joined the company in 1922 as a draftsman. He was the author of many technical articles on boilers, stokers, and bagasse furnaces. He was very active on the ASME Boiler and Pressure Code Committee.

• Carlos E. Bronson, former vice-president and chief engineer of KEWANEE BOILER DIV., AMERICAN RADIATOR AND STANDARD SANITARY CORPORATION, died at his home in Kewanee, Ill., on January 21. He was 71. He had been associated with the Division for 42 years, and was retired on December 31, 1956. He held life membership in ASME and ASHAE.

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Waterbury 20, Conn.

Send me my copy of Publication C-12, "Anaconda Copper Tube Fittings and Valves."

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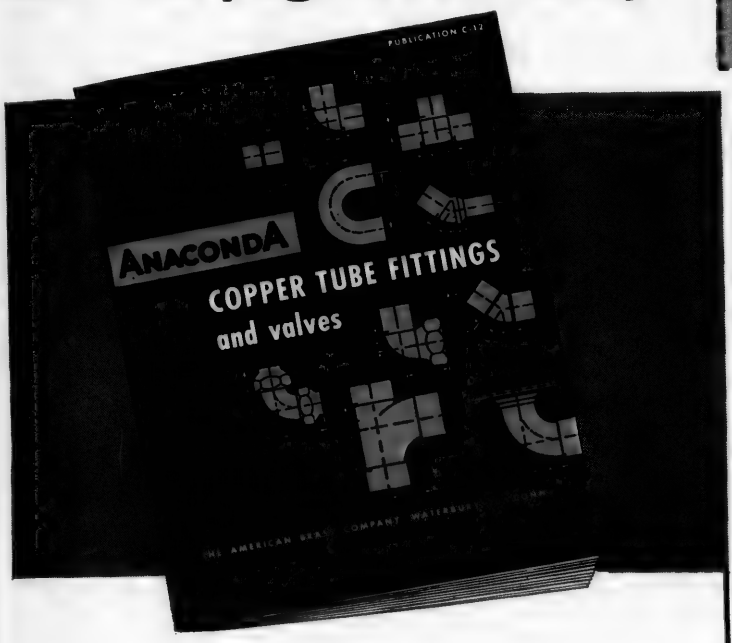

A CATALOG LISTING THE MOST COMPLETE RANGE OF FITTINGS FOR USE WITH COPPER TUBE.

- *Lists all sizes—bag quantity, where applicable*
- *Approximate net weights*
- *Roughing-in dimensions*
- *Suggestions for installation*

The full line of Anaconda Fittings is designed to match Anaconda Tube.

Anaconda Tube is consistently uniform in gage, size and temper. It's easy to work with.

Pick up both at your Anaconda wholesaler's – for fast, easy installations – for copper systems you can put in and forget.

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ANACONDA®

COPPER TUBES AND FITTINGS

AVAILABLE THROUGH PLUMBING WHOLESALERS

CONTENTS

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Wrought-Copper Solder-Joint Fittings. Nominal sizes ⅛" through 4".

SECTION 2

Wrought-Copper Solder-Joint Fittings for Refrigeration and Air Conditioning Use. Actual OD sizes 3/16" through 4⅛".

SECTION 3

Cast-Brass Solder-Joint Fittings. Nominal sizes ⅛" through 12".

SECTION 4

Cast-Brass Solder-Joint Drainage Fittings. In all standard combinations from 1¼" through 8".

SECTION 5

Brass Fittings for Flared Tubes. In all standard combinations, nominal sizes from ⅛" through 3".

SECTION 6

Flanged Fittings. In sizes to meet all standard requirements.

SECTION 7

Accessories. Hangers, Flanging and Sizing Tools, Tube Straps.

SECTION 8

Cast-Brass Valves. Full range of standard sizes and combinations.

Scientific Frontiers

Techniques for Air Pollution Analysis and Control

Studies dealing with the analysis and control of air pollution, while not strictly coordinated, are following certain definite patterns. The most apparent of these is the technique of "tagging" various suspected sources of air pollution for selective detection and identification. For example:

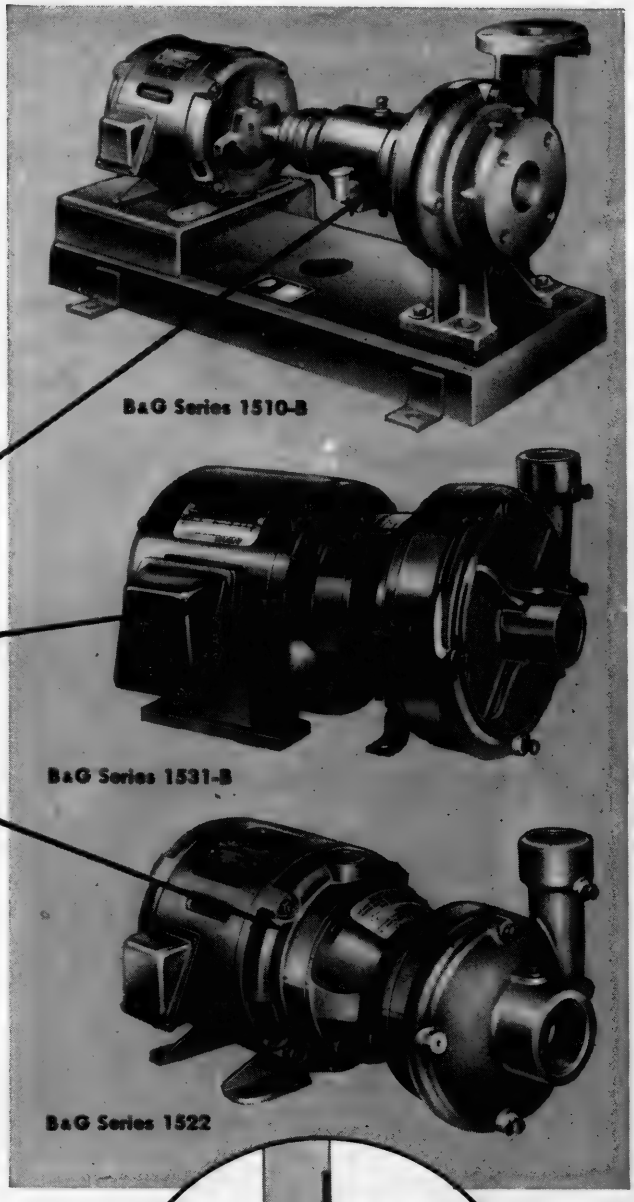
A technique involving radioactivation of a tracer substance, developed under the direction of Wesley C. L. Hemeon of Hemeon Associates, air pollution research engineers of Pittsburgh, consists of injecting the gases issuing from a smoke stack or other suspected source with finely powdered antimony oxide. Automatic air sampling instruments operating at scattered locations up to several miles away are ready to pick up any of the tracer powder that happens to drift past. After testing is completed, samples are collected from the various instruments and laboratory-analyzed to determine the quantity of any tracer powder caught by the instrument filter. Calculations can then be made to determine how much of the air pollution from the stack arrived at that location as compared with other sources. By deferring radioactivation of the tracer samples until after they have been collected in the laboratory, the extreme sensitivity of radioactive measurement is enjoyed without the hazard or inconvenience that would otherwise be experienced. This method fills a need important to both industry and to public agencies since it can resolve disputes as to the relative responsibility of different sources and lead to constructive action directed toward the real offender.

Sources of air pollution in the New York-New Jersey metropolitan area are many and varied, and include industry, power production, heating, petroleum refining, vehicular traffic, incinerators, burning dumps, and materials disposal. The Interstate Sanitation Commission has conducted tracer tests to determine the atmospheric transport of pollutants in both directions across the state boundary. A fluorescent zinc cadmium sulfide dust, chosen as the tracer material, was dispersed into the atmosphere at a number of points in both states by means of a mobile disseminator provided by the Army Chemical Corps. Dissemination was made from the roof of a sedan-delivery truck on the basis of wind conditions existing at various pre-selected points. One such test showed that a significant amount of pollution from New Jersey passed through Staten Island within six feet of the ground, considered to be man's normal living zone; another showed that contaminants were also airborne from Manhattan to New Jersey.

Advances in local air pollution control may be a by-product of the Atomic Energy Commission's radioactive fallout studies, according to Harry C. Ballman, Manager of Field Engineering Services, Bituminous Coal Institute, Washington, D.C. He stated that it is reasonable to believe that information gained from studies of fallout, which is basically an air pollutant whose movement is governed by meteorological phenomena, will do much to further progress in the control of other pollutants.

An analytical technique, making possible the rapid separation and identification of a wide range of hydrocarbons in quantities as low as four parts per 100-million parts of air, has been offered to interested research groups by Shell Development Co., Emeryville, Calif. Applied to automotive exhausts, it provides rapid information on the type and quantity of hydrocarbons which emerge from the engine unburned or only partly burned. Analyses are made by passing air samples through a long tube filled with finely ground solid material which physically separates various gaseous compounds from one another. They emerge separately from the column, and are automatically recorded. Technique can also be applied to incomplete burning of organic matter in incinerators.

WHEN YOU NEED A *GOOD* PUMP IN A *BIG* HURRY...

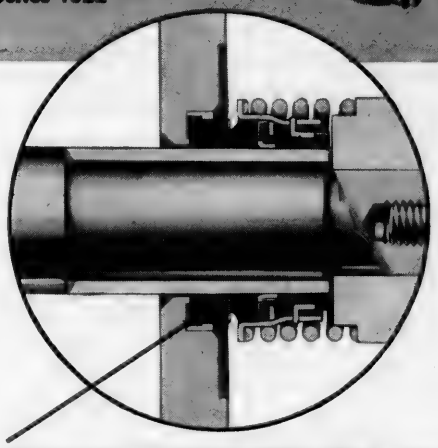


ORDER A B&G STOCK PUMP!

B&G maintains a factory stock of the most commonly used sizes of centrifugal pumps for immediate delivery. Base mounted and integral-motor pumps as listed in B&G Stock Pump Catalog are available in capacities to 325 GPM, heads to 140 ft.

Why B&G Centrifugal Pumps give years of trouble-free service is evident from their design features. Vertical split case construction permits removal of the bearing bracket without disconnecting pipe lines or motor leads. Special alloy steel shafts are super-finished and over-sized to keep deflection at a minimum.

Leak-proof operation is assured by the "Remite" Mechanical Seal—an exclusive B&G development. "Remite" is so hard it will cut glass—eliminates packing rings and gland adjustment. Seal is self-lubricating.



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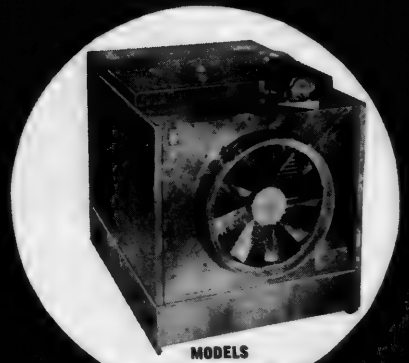
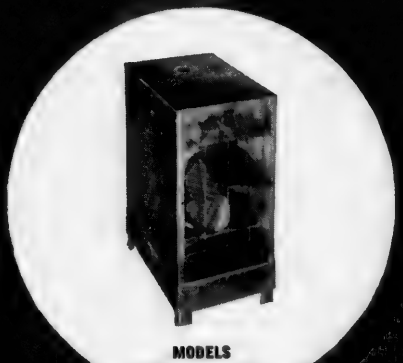
Here is the complete packaged cooling tower story . . . and the twentieth edition is just like the first—ALL MARLEY. Every year Marley know-how and Marley production ability write new, important chapters; they are so comprehensive that they cover the field from A to Z. That's why they are the industry's

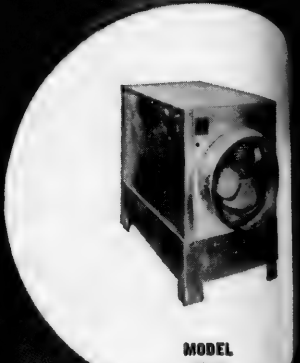
BEST SELLERS OF '58



MODELS
4315 thru 4360



MODELS
4205-4208-4210



MODEL
4203

11 Models with Nominal Capacities from 3 to 60 Tons

Hot Dip Galvanized After Fabrication—Prevents corrosion, assures longest service life

Diffusion Decks—Exclusive feature; essential to efficient initial water break-up

Close-Packed Filling Cube—More wetted surface, more performance per cubic foot

Drift Eliminators—Prolong service life of mechanical equipment; keep tower site dry

Air Inlet Louvers—Balance air flow, prevent splash-out

Marley Type L Fan—Most rugged fan used on towers of this type; non-overloading, prevents over-heating motor

Fan Venturi—Greatly reduces fan noise and entrance loss

Stainless Steel Fan Shaft—Mounted in Bronze Sleeve Bearings

Clamp-Down Design—Permits quick disassembly and reassembly of all models when necessary

MARLEY

MARLEY

MARLEY

Every job deserves Marley quality and every job can have it. Whatever the requirement — induced draft, forced draft, natural draft—the tower pin-pointed for the application is in the complete Marley line. Never a need to compromise on size, style or structural material — Marley makes them all available.

And of equal importance, when you select Marley you gain two partners earnestly interested in the success of every job: your Marley distributor and Marley. The distributor who sells Marley towers has been carefully selected for his willingness and ability to serve you both before and after your purchase. He, in turn, is backed by The Marley Company's assurance that every product will be satisfactory to every purchaser — a guarantee fulfilled for 35 years.

Today's market makes this teamwork important on every job and Marley makes it available to you with every tower you install.

The Marley Company

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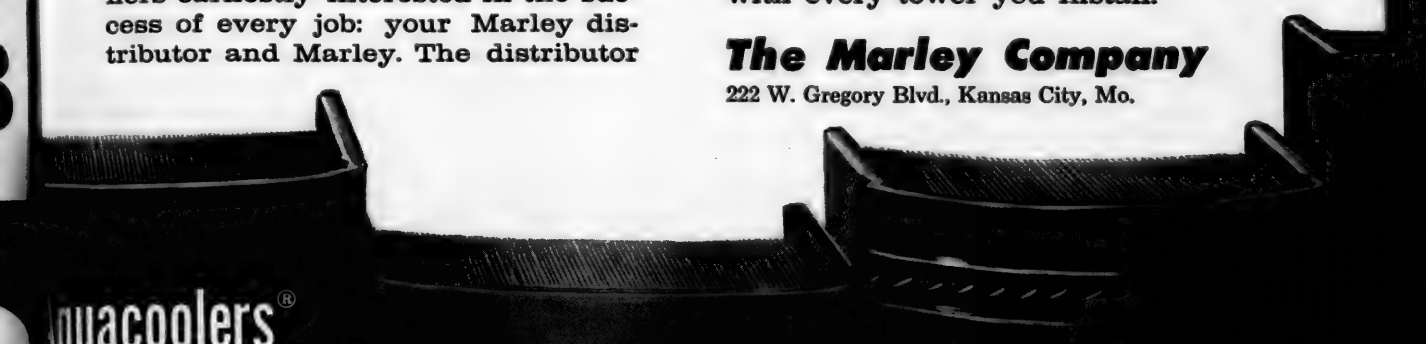

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Nine models with capacities nominally rated from 5 to 50 tons

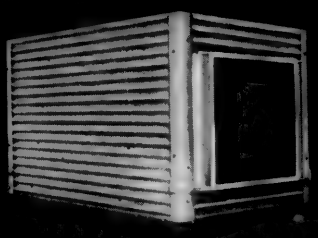
For installation indoors or out

Consistent, full capacity performance

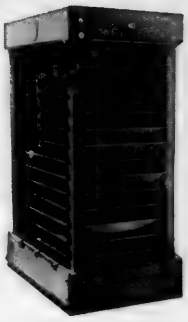
Whisper-quiet operation

Requires minimum plan area

Adjustable air delivery



SPRATOWERS®



A complete range of capacities

Provides maximum water cooling economy

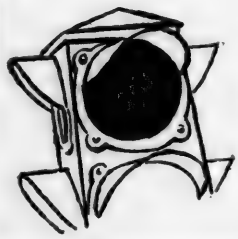
Non-clog bronze spray nozzles

Balanced spray system

Long-life redwood construction

Prefabricated for quick installation

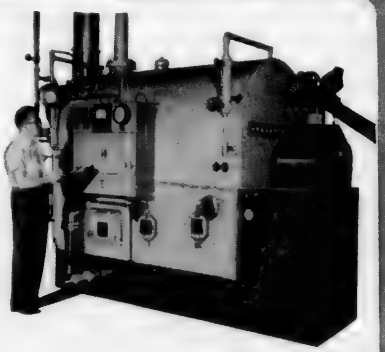
MARLEY



STOP and SEE!

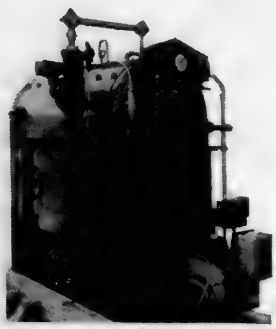
3 Better WATER TUBE Package Units by INTERNATIONAL

the COAL-PAK AUTOMATIC



First FULLY AUTOMATIC package unit complete with combustion controls, automatic coal feed and ash removal system, for burning LOW COST BITUMINOUS COAL cleanly and efficiently.

Write for Bulletin 1100



the COMPAK

First FORCED DRAFT water tube package unit with a price tag EQUAL TO OR BELOW firetube scotch package boilers. For low or high pressure requirements, oil or gas fired.

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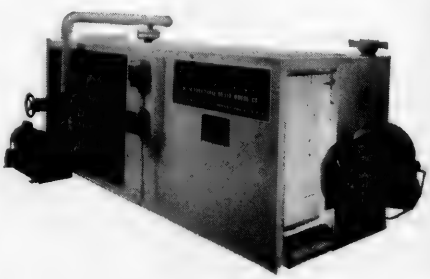
the THERMOJET



First FORCED RECIRCULATION package unit that actually requires LESS HEADROOM than modified scotch package boilers. Famous LA MONT boiler design specifically adapted for SINGLE BUILDING low or high temperature water heating systems.

Write for Bulletin 1000

Get the facts from your INTERNATIONAL DISTRICT REPRESENTATIVE or write for Bulletins listed above

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890 Spruce St. East Stroudsburg, Pa.

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Consumer approach to design problem revealed...

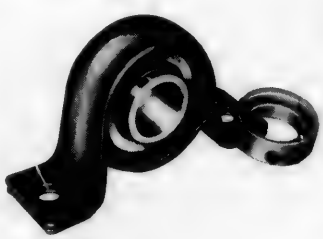
by this Fafnir-equipped

Typical Carrier Residential *Weathermaker* Installation

Just a glance at this *Residential Weathermaker* will show you how Carrier designers have catered to the interests of the consumer. The Fafnir super-quiet, permanently-lubricated pillow block circled above is a case in point. Installed on condenser units and fan, these Fafnir rubber-cushioned units eliminate a troublesome servicing problem and operate whisper-quiet. There are six of them on this *Weathermaker*.

By careful study and research into the requirements of residential heating and air-conditioning, Fafnir has developed a line of ball bearings and ball bearing units best suited to residential service. Consequently these units are contributing much towards the consumer acceptance of air-conditioning. Here is a typical example of the Fafnir "attitude and aptitude" . . . a way of looking at bearing problems from the manufacturer's viewpoint and an ability to supply the right bearing for the specific application. Perhaps they represent your means of solving a bearing problem effectively and economically. Consult your Fafnir Bearing Specialist, The Fafnir Bearing Company, New Britain, Conn.

FAFNIR
BALL BEARINGS
MOST COMPLETE LINE IN AMERICA



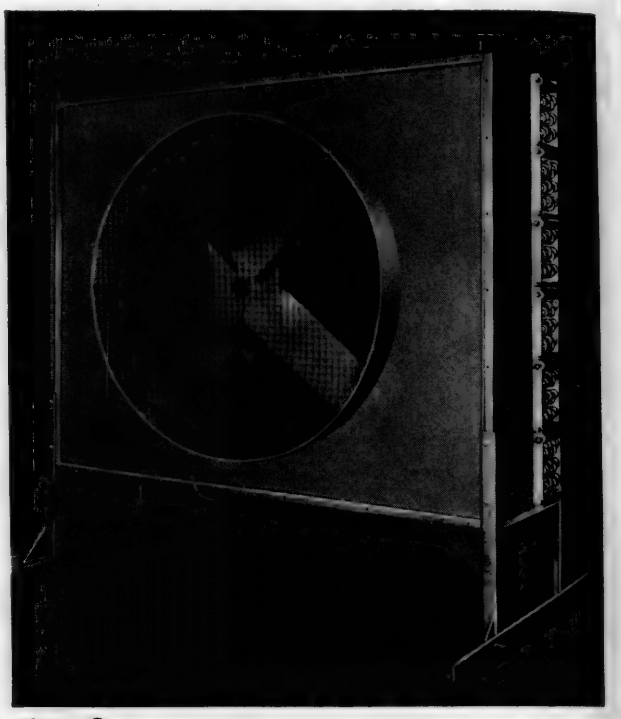
FAFNIR RPB BALL BEARING UNIT

. . . one of a line of air-conditioning ball bearings and ball bearing units. Features include wide inner ring ball bearings with self-locking collar (easiest of all to install) super-quiet bearing construction, Fafnir Plya-Seals (contact-type), plus electric-current-conducting rubber grommets. Write for bulletin.

9 - 11 - 15 - 20 - 25 - 30 - 40 - 50

NOW... 8 SIZES UP TO 50 TONS

In a Single Unit



McQuay "AB" Belt Drive AIRCON

Remote, waterless condensers available in eight sizes, 9, 11, 15, 20, 25, 30, 40 and 50 ton nominal capacities in individual units with single fan and motor assemblies. Coils constructed of copper tubes with McQuay Ripple Fins. Lifetime ball bearing and slow speed propeller type fan.

McQUAY AIRCON *Air Cooled Condensers*

Here is the finest, the most complete, most versatile, the most efficient line of remote air cooled condensers on the market, as well as the largest available in a single unit. There are eight McQuay "AB" Belt Drive AIRCON Air Cooled Condensers from 9 to 50 ton nominal capacities. McQuay also offers the "AD" Direct Drive AIRCON Line of Air Cooled Condensers in 2, 3 and 5 ton nominal capacities. All McQuay AIRCONS are designed for multiple circuiting so that two or more separate refrigeration systems can be connected to the same condenser.

PEAK PERFORMANCE ALL YEAR 'ROUND WITH "SEASONTROL" MODULATION.

The McQuay "Seasontrol" modulates the condenser capacity in accordance with the weather for proper operation at all times. There is a McQuay representative in every principal city, or write McQuay, Inc., 1619 Broadway St., N.E., Minneapolis 13, Minn.

McQuay Means Quality

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AIR CONDITIONING
HEATING
REFRIGERATION

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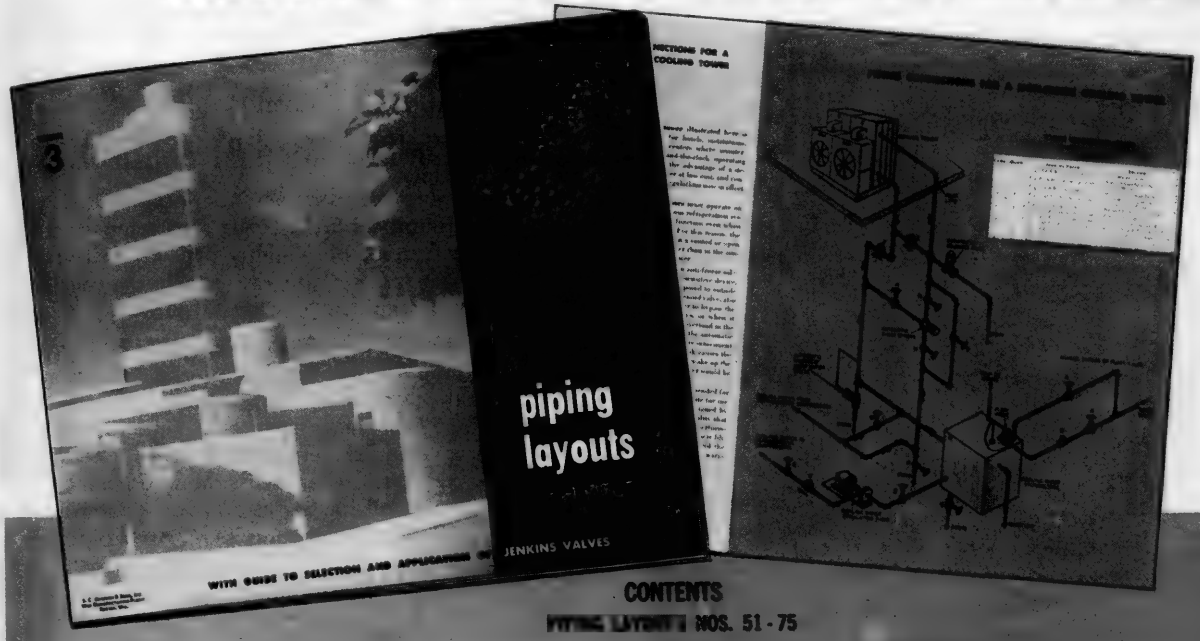
in the famous series of

JENKINS PRACTICAL PIPING LAYOUTS *Books*



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PLUS 10 PAGES OF VALVE SPECIFICATIONS

Volume 3 is a 36-page collection of 25 basic piping diagrams with complete recommendations for valve selection and location in the lines. The material has been prepared by registered consulting engineers in collaboration with the Jenkins Bros. engineering staff and leading equipment manufacturers. It supplements the two booklets released by Jenkins Bros. in past years as a service to consulting engineers, architects, contractors, specification writers and plant operation managers.

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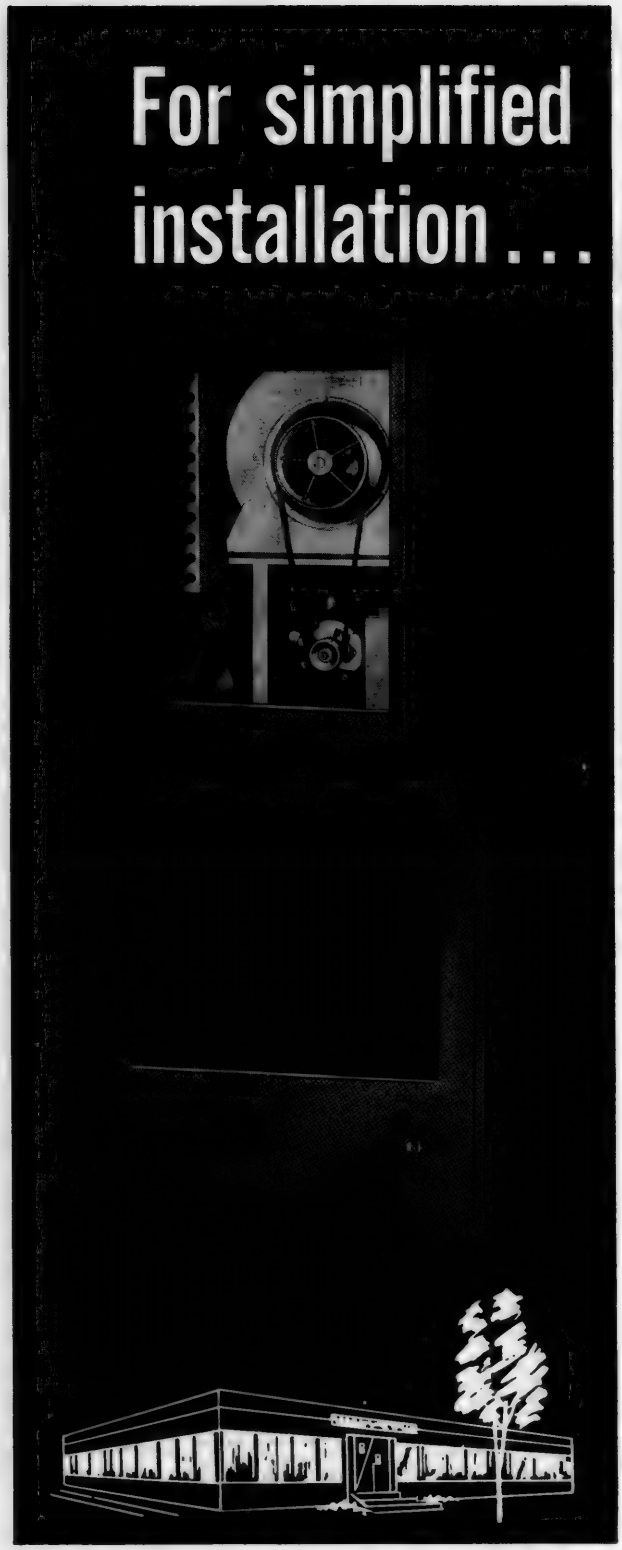

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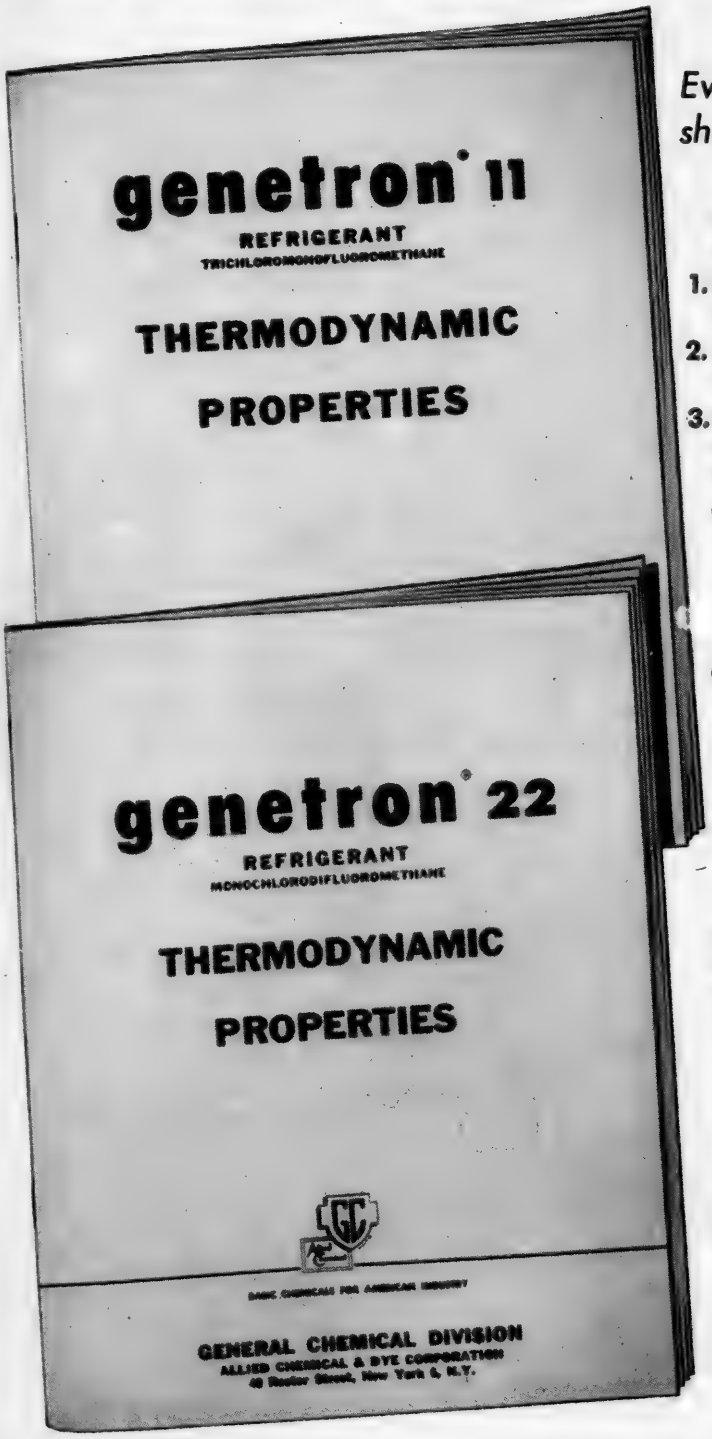

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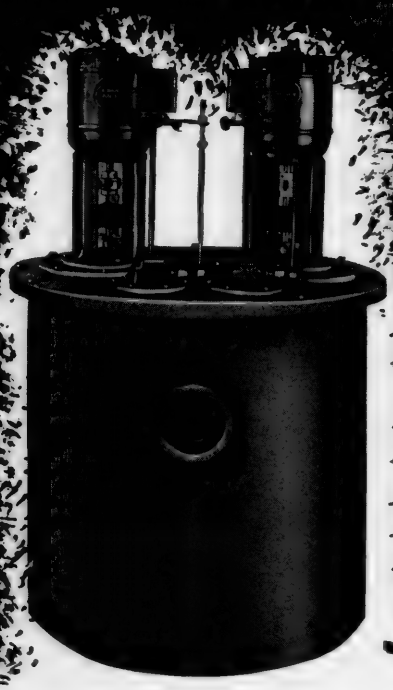

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Pressures—10 to 75 lbs.

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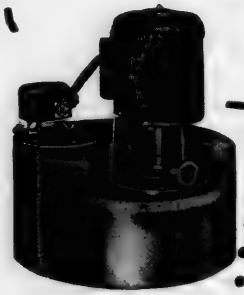

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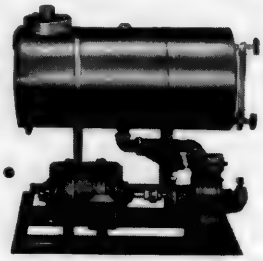

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PHILCO® CENTRAL Air Conditioning!

Philco, most wanted name in air conditioning has a few choice Direct Factory Distributor Franchises still available to selected businessmen in key sales areas. Here is your opportunity of a lifetime to join forces with the sales winner!

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You can make this year the biggest in your history . . . with an exclusive, Direct Factory Franchise to sell, install and service the new line of Philco central system air conditioning! Act now . . . get on the winning team. Central air conditioning for homes and businesses is booming all over the Nation. Millions of dollars will be made in this tremendous new field . . . right in your own back yard. And Philco has the hottest new line . . . with the lowest prices in the industry.

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Key franchises are still open for applications in some key markets. Merchandise is now in inventory for delivery at once. Now is the time to get on the big profit side of your business . . . with Philco central air conditioning.

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For full information, write for Bulletin 3720-A.

SPECIAL FEATURES AVAILABLE

All-Weather Cover and Rain Shield. Drain Connection in bottom fan housing. Access Door in scroll. Inlet and Outlet Screens. Non-sparking Aluminum Wheels. Enclosed or Explosion-Proof Motors. Ball Bearing Motors. Anti-Vibration Pads. Stainless Steel or Aluminum Construction for Units having all parts in contact with gas or fumes. Belt Guard. Gravity Type, Hand-Operated or Motor-Operated Outlet Shutters. Special Protective Coatings on Inside Housing and Wheel.

All "Buffalo" products feature the famous "Q" Factor—the built-in Quality that assures trouble-free satisfaction and long life.

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COOLING
HEATING
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BLOWING

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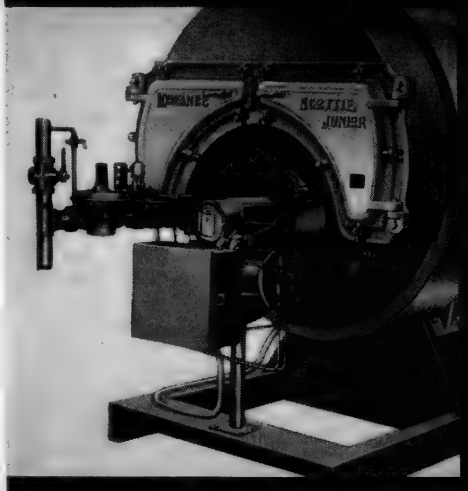
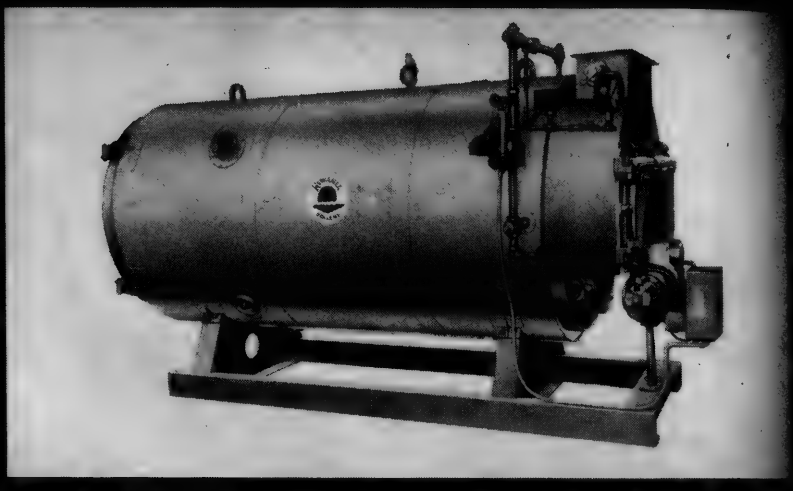
KEWANEE

FORCED-DRAFT



GAS-OIL COMBINATION FIRING for the new Kewanee package units is provided by this Kewanee burner designed for quick fuel change-over without adjustments.



NEW 606,000 TO 3,060,000 Btuh CAPACITIES: Kewanee Scottie Jr. low pressure boiler with Kewanee burner. Firing rate is balanced with boiler capacity. Oil burner (shown) is high pressure, twin nozzle type. Gas burner is equipped for either natural or LP gas.

another KEWANEE® quality product . . . proven in the field

Now . . . Kewanee provides 8 popular high pressure packages, 18 to 92 horsepower . . . 8 low pressure packages, 606,000 to 3,060,000 Btuh.

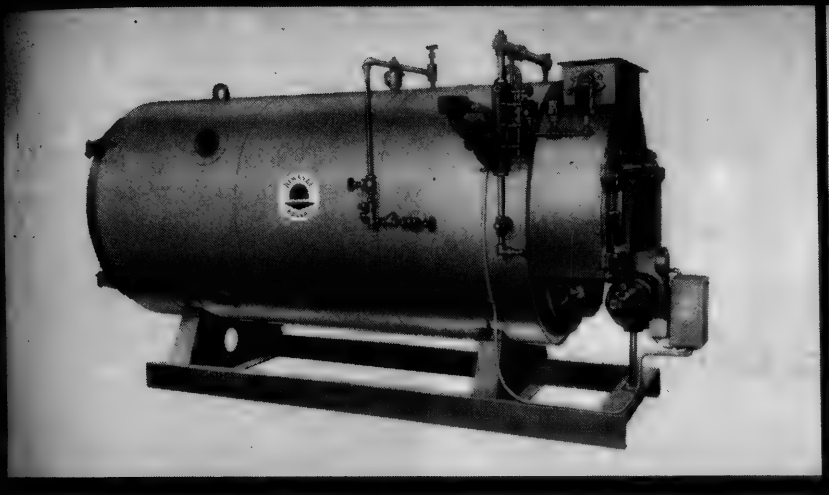
Forced-draft firing keeps combustion air supply constant, regardless of location or atmospheric conditions. Only a vent pipe is needed. The long, low lines of today's buildings are not violated by a costly, unsightly stack. Nor does the boiler room ceiling need to be higher than a standard 8 feet.

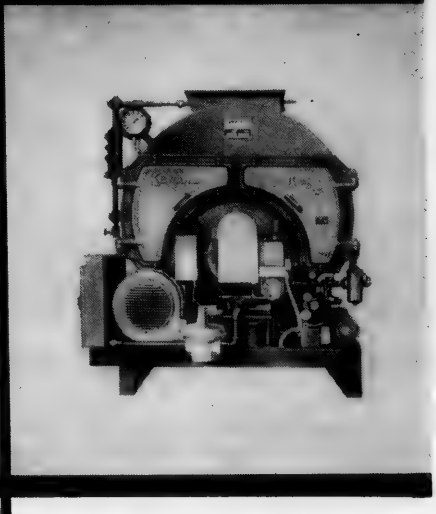
Fuel flexibility is provided by Kewanee burners for oil, gas or gas-oil combination firing. On combination units, fuel changeover is simple and fast . . . can be handled by automatic controls if desired.

Traditional Kewanee quality is engineered into the complete unit. Reserve strength is built into

18 TO 92 HORSEPOWER

PACKAGE UNITS





NEW 18 TO 92 HP CAPACITIES: For 125-150 swp or high temperature water above 250° F. Kewanee Scottie Jr. high pressure boiler with a Kewanee burner for oil (shown) or gas. Features include long gas travel, ample steam space, x-rayed and stress relieved welds.

OTHER LARGER KEWANEE BOILERS range up to 651 hp for high pressure . . . 21,855,000 Btuh for low pressure. Matching forced-draft burners are available for oil, gas and gas-oil combination firing.

all parts . . . moving parts are accurately machined to close tolerances. All features of design and construction are aimed at maximum dependability and long-range economy. Easy access is provided for boiler inspection and cleaning.

Kewanee factory-assembles the entire unit before shipping. The boiler is fitted with burner and controls at the factory, with controls housed in integral control panel. Boiler gages and controls are in place, as well as rear combustion chamber of high temperature refractory. Unit is shipped as a complete package—fire-tested if desired.

Send coupon at right for complete information. Clip it today and mail it to:

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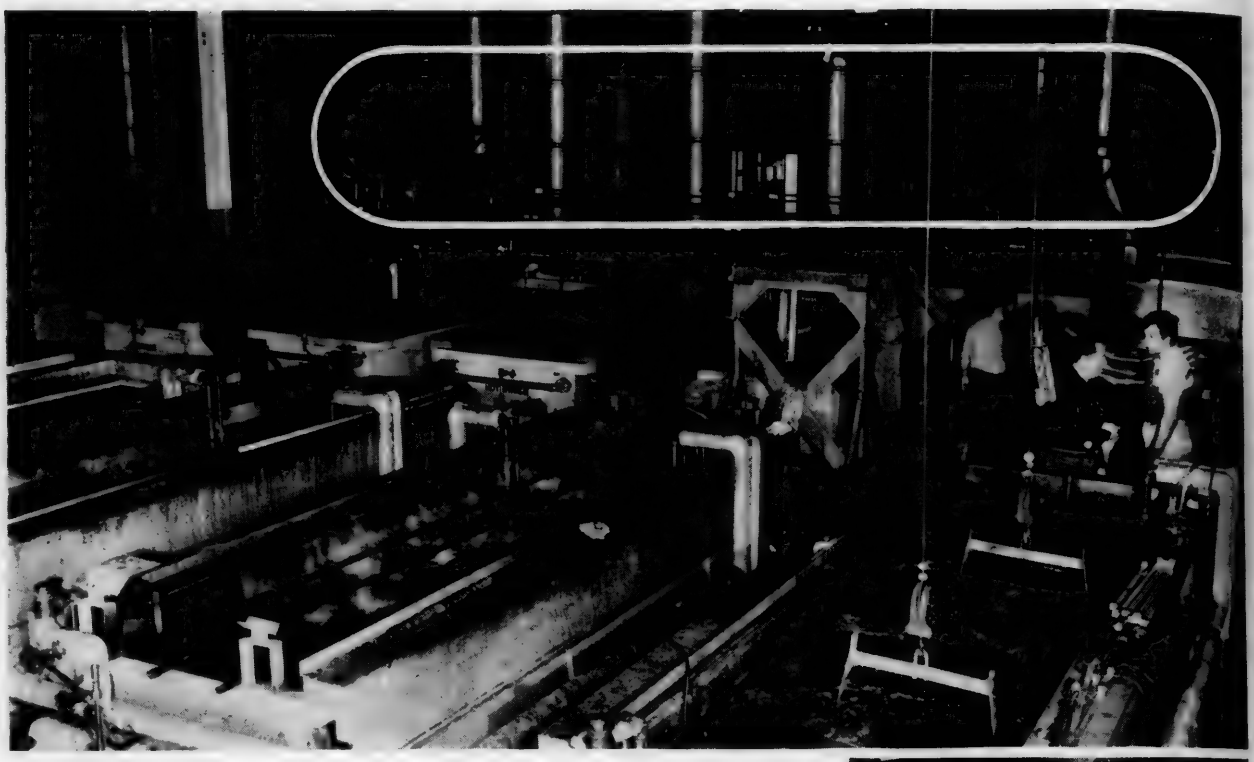


Here's a Unique Answer to a Tough Ventilating Problem . . .

Efficient Plating Tank Exhaust with No Overhead Obstruction

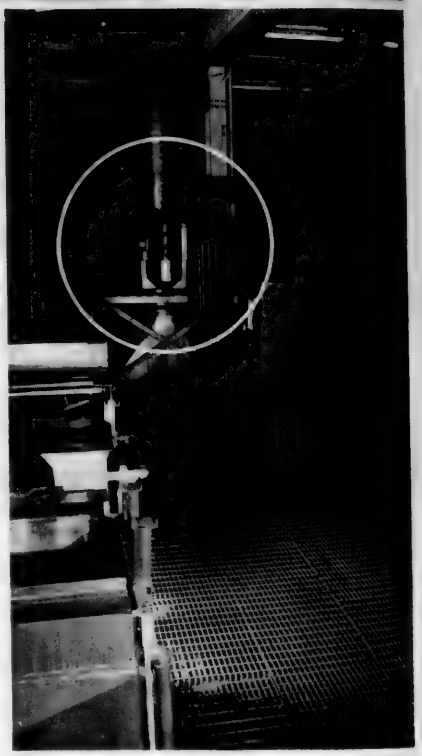
Hartzell High-Temperature Vaneaxial Blowers power this unique plating tank exhaust system at the Stratford, Connecticut plant of Sikorsky Aircraft Division, United Aircraft Corporation.

Use of the lateral slots and sub-floor ducts keeps aisles clear . . . and no part of the exhaust system extends above the tanks to hamper use of cranes in loading and unloading the tanks.

Exhaust of 200 CFM per square foot of tank area is provided with all blowers operating at approximately 2½" WG. Fumes are exhausted vertically through the roof.

Hartzell has the equipment that is just right for almost any industrial air moving job. See your nearby Hartzell field engineer for the details of how Hartzell can solve *your* tough air moving problem.

This installation was handled by the Hartzell field office at 1243 Post Road; Fairfield, Connecticut; phone Clearwater 9-3349.



Why You Can Count on Hartzell Air-Moving Equipment for Long Life, Rugged Reliability and Minimum Maintenance

Hartzell fans and blowers are engineered and built for the exacting requirements of tough industrial service. There's no compromise with quality for the sake of shaving a few dollars on price. Hartzell fans are designed for the industrial buyer who is willing to pay for long life, dependable service and low maintenance.

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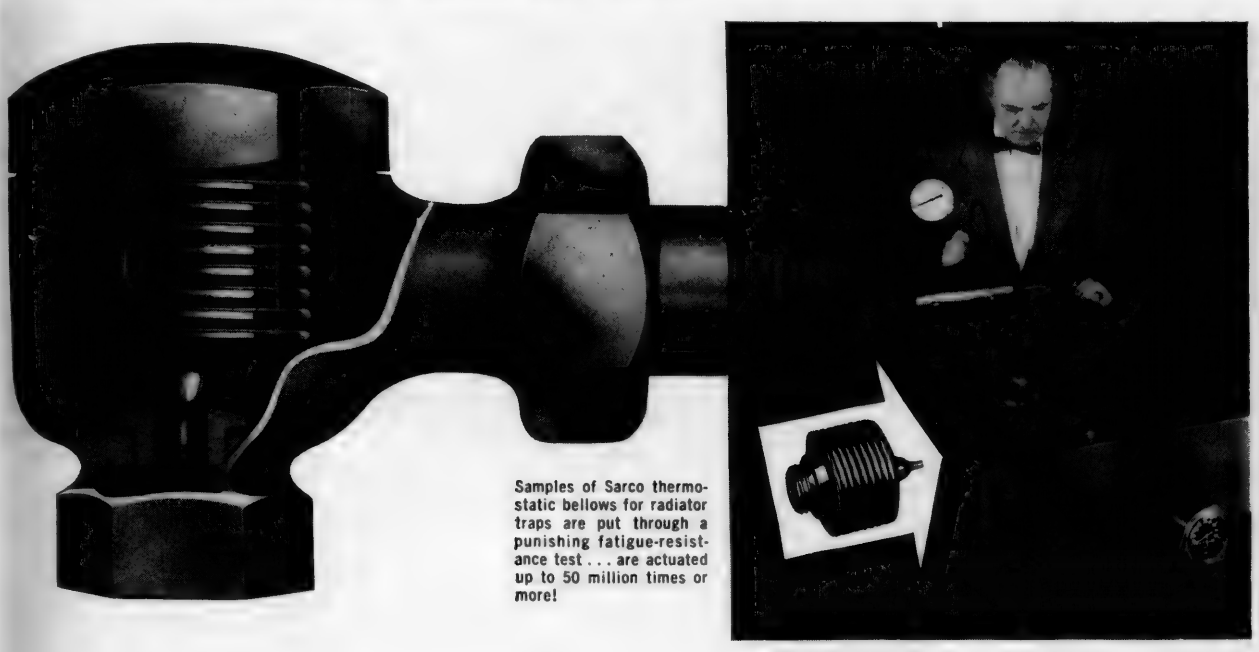
50,000,000 cycles can't be wrong!

How Sarco guarantees "on-the-job" performance of Thermostatic Radiator Traps



Samples of Sarco thermostatic bellows for radiator traps are put through a punishing fatigue-resistance test . . . are actuated up to 50 million times or more!

This is the most gruelling test a thermostatic radiator trap could possibly get. It's a thermostatic bellows test that goes on endlessly . . . day after day, year after year . . . in the Sarco Research Lab.

In this Sarco research and product development work, thermostatic bellows for Sarco radiator traps are expanded and contracted 50,000,000 times or more to test and study their fatigue-resistance!

Further to assure you the utmost on-the-job dependability, production samples of Sarco thermostatic bellows are tested to *10 million cycles* and more!

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Extra-strong union nut and nipple — made of bar stock, not just brass castings.

Extra-rugged body — insured by *pressure* casting. Eliminates porosity. Maximum insurance against hidden defects.

Every body pressure-tested at maximum rated steam pressure.

Removable seat — for easy replacement. Seat and self-aligning valve head made of hard bronze.

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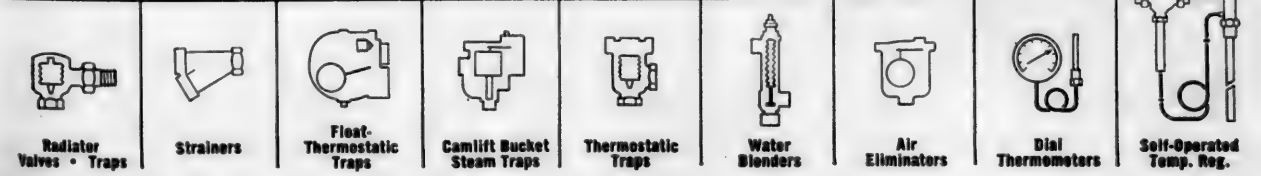
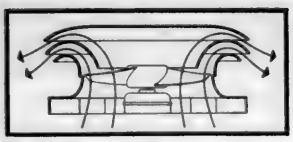


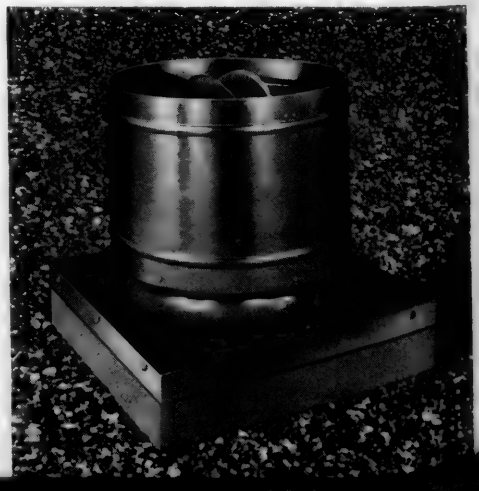
Now! Low cost v
the Trane Axial F



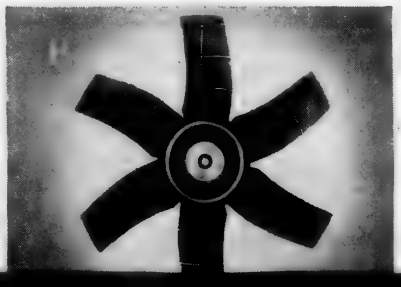
Streamlined design, with annular-vaned hood substantially reduces turbulence and increases efficiency. Fan wheel is mounted above motor in both types of ventilators to allow unobstructed flow of air on discharge side.

Hooded type Axial Roof Ventilator has specially engineered annular turning louvers to reduce pressure loss. May be used for exhaust or summer supply. Meets blackout requirement. Available with three types of positive or gravity dampers.

Vertical exhaust ventilator. This type of new TRANE Axial Roof Ventilator is used to exhaust hot or dirty air. Discharges air straight up, away from roof. Sloping gravity dampers open when fan starts, close when fan stops.



Model B fans—3 or 6 bladed—are furnished with TRANE Axial Roof Ventilators. Fan blades are arc-welded to the spun fan hubs. Stiffeners spot-welded to blades for added reinforcement.



t ventilation with l Roof Ventilator

New from Trane . . . a low silhouette, high efficiency ventilator that's completely accessible from the roof!

Here's a roof ventilator that will provide economical ventilation for mills, factories, warehouses and all large buildings with open type interiors. It's the new TRANE Axial Roof Ventilator—designed to provide lower silhouette, lower initial cost, low power consumption, complete accessibility from the roof.

Available in two basic types—hooded or vertical exhaust—the new TRANE Axial Roof Ventilators come in five sizes: 24, 30, 36, 42 and 48-inch fan wheel diameter. Models are available to handle corrosive and explosive fumes and gases.

Easy to maintain, these ventilators have easily accessible motors and drive belts; complete assembly pivots for fast service or inspection.

Next time you're planning a factory or commercial ventilation job, make it TRANE! For complete facts, just call your nearby TRANE Sales Office or write TRANE, La Crosse, Wisconsin.

Check these features!

- *AMCA Certified Rating Seal*—Units tested and rated according to the Standard Code of the Air Moving and Conditioning Association (AMCA) and the ASHAE.
- *Low silhouette*—For trim appearance. 24-inch ventilator is only 19 3/16" above roof line.
- *Easy maintenance*—Hood slips off easily for access to motor and belts. Complete assembly pivots. Safety switch on unit permits maintenance man to disconnect fan for service.
- *Quality construction*—All wheels are scientifically balanced. Blades are blanked and die-formed complete with beads to insure permanent set of blade contour. For added reinforcement, stiffening plates are spot-welded to each blade. Motors are totally enclosed.
- *Versatile*—Complete range of five sizes from 24-inch to 48-inch wheel diameter. Two basic types: vertical exhaust, and hooded exhaust or supply. Models available to handle corrosive and explosive fumes and gases.
- *Safe*—Units are available with built-in spring and fusible link to control damper in presence of fire.

For any air condition, turn to

TRANE

MANUFACTURING ENGINEERS OF AIR CONDITIONING, HEATING, VENTILATING AND HEAT TRANSFER EQUIPMENT

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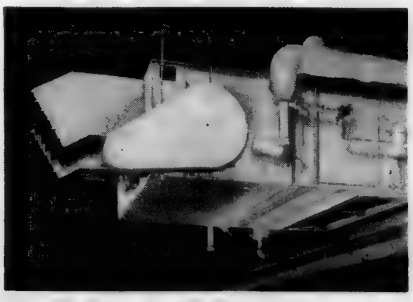
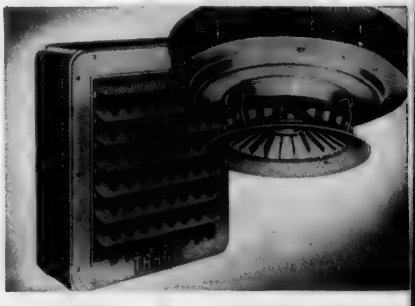
TRANE COMPANY OF CANADA, LTD., TORONTO • 96 U.S. AND 19 CANADIAN OFFICES

Centrifugal Roof Ventilator for quiet, high-volume ventilation against higher static pressures. Streamlined, lightweight, compact, easy to install. 16 fan sizes from 7" to 40" wheel.



TRANE Torrivent heats and ventilates large areas. Rugged, efficient centrifugal units handle up to 33,000 cfm. May be installed on floor, ceiling or wall, with or without duct work.



TRANE Unit Heaters—Horizontal or Projection types—put the heat where you want it! Patented diffusion feature gives an unlimited number of heating patterns.

NEW WAY TO SELL COMMERCIAL AIR CONDITIONERS

Ups Your Sales and Profits Because...

'58 YORK LEASE PLAN

FOR SINGLE OR MULTIPLE SPACE INSTALLATIONS

CUSTOMERS NEED MAKE NO CAPITAL INVESTMENT!

When you sell air conditioners the York Lease Plan Way you sell *more*, make *more* because you offer customers *more* for their money! You offer longer term than lending institutions...savings on taxes...rapid depreciation write-off...dozens of other money-saving benefits!

'58 YORK Self-Contained AIR CONDITIONERS

May be installed singly or in multiple to fit the special needs of any size or type business. No special foundations required, no need to tear the building apart. Installs quickly, easily—without interrupting business routine.

YOU GET PAYMENT IN FULL IMMEDIATELY!

When you sign up a customer, you simply turn over the lease and title to our lease company and get cash on the line in return—immediately! You never worry about slow-paying customers, bad debts, service! Call your York Distributor for full details, today!

Your FUTURE and FORTUNE Now Lies With York!

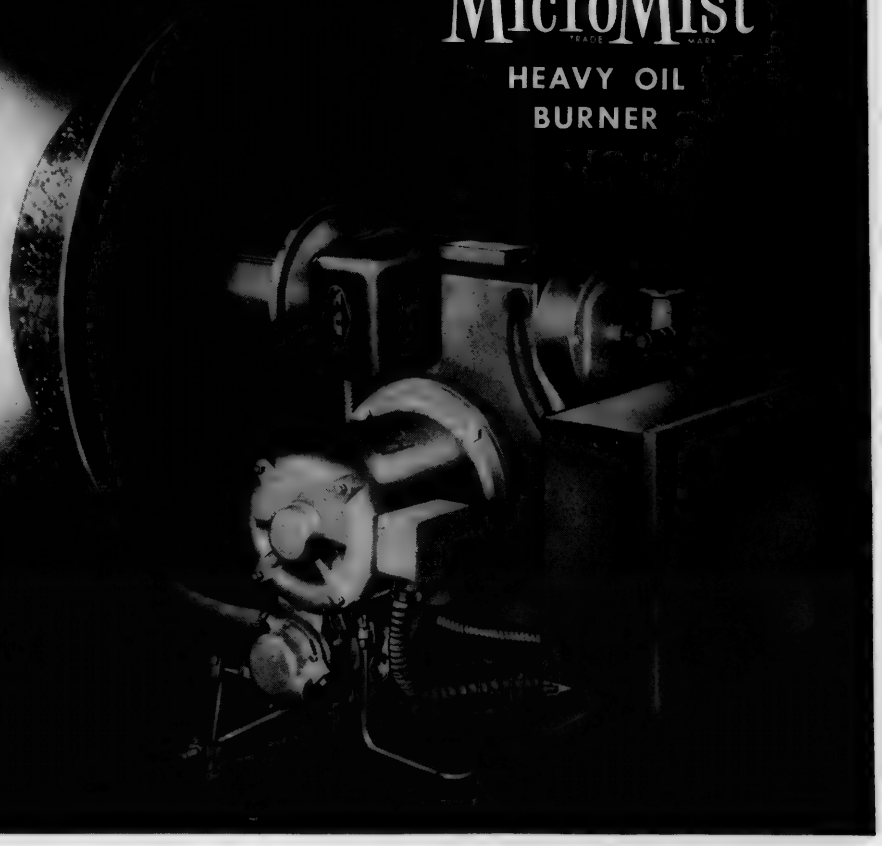
York BW

Another new development by Iron Fireman

MicroMist
TRADE MARK

HEAVY OIL
BURNER

TWO-STAGE ATOMIZER CHANGES HEAVY OIL TO AN AERATED FOG, WITH THE CHARACTERISTICS OF A GAS—NOT A SPRAY



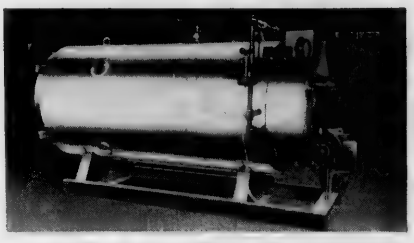
Now a medium size burner that fires low cost oils

New two-stage atomizing principle

The heart of the Iron Fireman MicroMist burner is an ingenious compressor-atomizer. The compressor reduces the oil to an air mixed spray (which is as far as other burners go) then by the heat of compression, into an air-oil vapor. The oil is so finely divided that it becomes an oil mist or fog that will remain in suspension for several hours. It is easily and directly ignited by an electric spark (does not require gas ignition). Now medium size heating plants (previously restricted to light, expensive oils) can switch to low cost heavy oil with substantial savings in fuel costs.

Note these additional features

The Iron Fireman MicroMist burner is as easily installed as a conventional gun type burner. It has two important uses. (1) As a conversion burner with any type of boiler. No special boiler front is required. (2) As a component part of a packaged boiler-burner unit. The choice of oil grades is almost unlimited (from No. 5 down to the lightest fuel oils). Integral control panel is wired and tested at the factory. Fuel and maintenance costs are low. Eliminates frequent nozzle inspection and cleaning, because of the large orifice to disperse the oil mist. Fires low-cost, heavy oils with little more attention than a domestic oil burner.



Available as a complete package ready to operate . . . Scotch boiler, burner, controls

Installation requires little more than service connections. Easily specified from catalog list of sizes and capacities. Available for either natural or forced draft. Firing unit can be ordered separately for installation in any type of boiler.

Send for more information

IRON FIREMAN®

AUTOMATIC FIRING EQUIPMENT
FOR HEATING, POWER, PROCESSING

IRON FIREMAN MANUFACTURING CO.
3067 West 106th Street, Cleveland 11, Ohio
(In Canada, 80 Ward Street, Toronto, Ontario)
Please send me more information and specifications on the Iron Fireman MicroMist burner.

Name_____
Firm_____
Address_____
City_____ Zone____ State_____

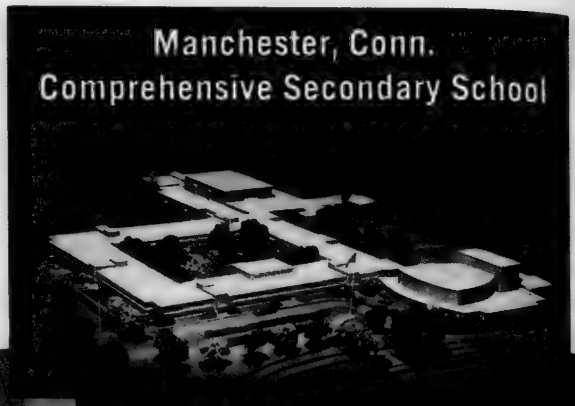
One of New England's largest contemporary high schools accommodates over 2500 students in a building with 268,000 sq. ft. of floor space built at low construction cost of $12.88 per sq. ft.

Architects: Ebbets, Frid and Prentice, Hartford, Conn.

Mechanical Engineers: Paul D. Bemis, C. W. Freeman, Hartford, Conn.

General Contractor: M. S. Kelliher Co., Boston, Mass.

Heating and Vent. Contractor: Fredrick Raff Co., Inc., Hartford, Conn.



Science Department includes 5 general science labs, 2 chemistry labs, a physics lab, also 2 biology classrooms where students learn about the wonders of life.

The right room temperature for every school activity is provided by Powers DAY-NIGHT Thermostats.

Unoccupied rooms are held at economical lower temperatures.

The heating system is divided into 16 zones for day-night control depending on type of activity. 212 Powers thermostats control 267 convector valves, 17 large supply units, 15 unit ventilators, 8 exhaust fan systems, 23 force flow heaters and 11 unit heaters.

6-Lane Swimming Pool water temperature, radiant panel heating around the pool's edge and domestic hot water supply are all controlled by POWERS Accritem Regulators and Flowrite Valves.

Help TAXPAYERS for Your New School

Get the MONEY-SAVING BENEFITS of

POWERS Temperature Control

Good School Planning in Manchester's outstanding 91-classroom high school includes many modern features and equipment that contribute to the efficient, economical operation of its $5,000,000 investment. Accurate temperature control, for example, provides:

Thermal comfort assured by a POWERS Quality System of Temperature Control helps keep teachers happy, protects health of students, keeps them alert, aids concentration.

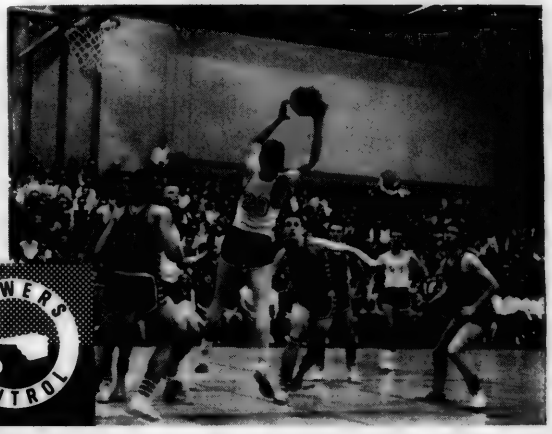
Lower heating costs—Powers accurate control prevents waste of fuel in overheated and unoccupied classrooms. Fuel economy alone will pay back the cost of Powers Control.

Low cost maintenance—Simplicity and year after year dependability with little attention, is one of Powers most valuable features.

15 to 30 Years of dependable control with a minimum of repairs are often reported by Powers users. Some 50 year old Powers installations are still in operation.

Prompt service by skilled Powers engineers and mechanics.

In your new school make sure taxpayers get the biggest return on their investment in accurate temperature control. Ask your architect or engineer to include a time-proven Powers Quality System of Control.



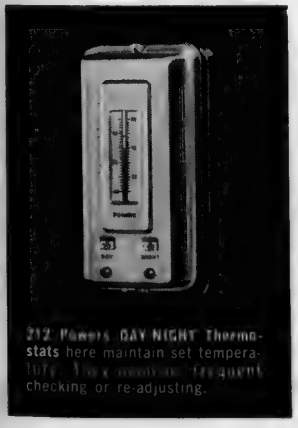
Above: one of three modern gymnasiums.

For further information contact our nearest office

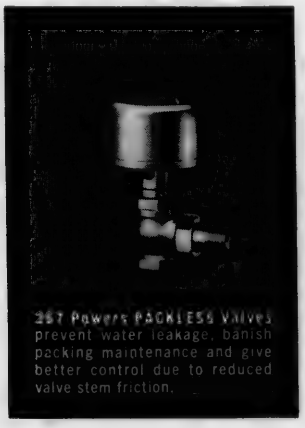
THE POWERS REGULATOR COMPANY

SKOKIE, ILLINOIS | *Offices in Chief Cities in U.S.A. and Canada*

65 YEARS OF AUTOMATIC TEMPERATURE AND HUMIDITY CONTROL



212 Powers DAY-NIGHT Thermostats here maintain set temperature. Few require frequent checking or re-adjusting.



257 Powers PACKLESS Valves prevent water leakage, banish packing maintenance and give better control due to reduced valve stem friction.

(C24)

Architect: KENNETH FRANZHEIM, HOUSTON, TEXAS
Consulting Engineer: H. E. BOVAY, JR.
General Contractor: W. S. BELLOWS CONSTRUCTION CO., HOUSTON, TEXAS
Mechanical Contractors: BARBER, INC., and STRAUS-FRANK CO., HOUSTON, TEXAS

Air-conditioning the ultramodern

Bank of the Southwest

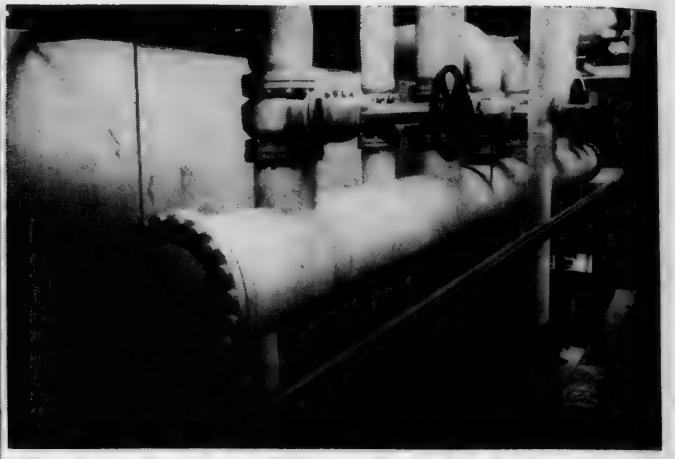
In Houston, Texas, covering a solid city block, is one of the most architecturally sophisticated banks in the Southwest. Its four-story base, sheathed in red granite, encloses a spacious bank and a panorama of shopping arcades. Topping the base is a gleaming tower of business offices.

Completely air-conditioned, the new Bank of the Southwest building employs over 150 tons of USS NATIONAL Seamless Steel Pipe in its vast system. Sizes range from 2 inches in diameter through 20 inches.

USS NATIONAL Seamless Pipe is consistently the number one choice of engineers and contractors throughout the country for air-conditioning, heating and power installations. Its ability to render efficient, trouble-free service under all types of pressure and temperature conditions has given NATIONAL Seamless a reputation for safety and dependability excelled by no other pipe. For further information or assistance with your pipe problems, get in touch with us.

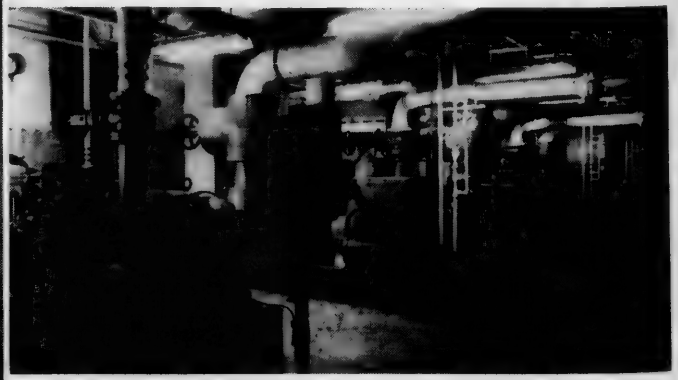
NATIONAL TUBE DIVISION,
UNITED STATES STEEL CORPORATION, PITTSBURGH, PA.
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO,
PACIFIC COAST DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

NATIONAL PIPE — USS



20-inch drop header with 10-inch boiler leads on the steam heater system take-off from the boilers. All NATIONAL Seamless.

4-inch domestic hot water piping to generators and surge tanks. All NATIONAL Seamless.



12-inch NATIONAL Seamless Pipe from tower to main condenser and chill water pumps and gear boxes.

UNITED STATES STEEL

CASE #100—Another case where General Electric Factory-Assembled Air Conditioning Units proved more economical than field-assembled systems.

General Electric Ceiling-Mounted Units at the Dallas Home Furnishings Mart take no floor space—provide individual temperature control (heat and cool)—are metered for zone control of operating cost.

Architect-Engineer: [illegible]
General Contractor: James C. Stewart Co.

General Electric Zone-by-Zone Air Conditioning in Dallas Home Furnishings Mart permits

INDIVIDUAL CONTROL OF TEMPERATURE—ZONE CONTROL OF OPERATING COST

Air conditioning the vast new Dallas Home Furnishings Mart presented a 3-way challenge. (1) Over 400,000 sq. ft. to be air conditioned. (2) Provision had to be made for each exhibitor to control his own temperature and operating cost. (3) Floor space was at a premium. The ideal solution was found—in the Zone-by-Zone installation of General Electric Ceiling-Mounted Units.

The entire area gets heating and cooling from the same units. Each exhibit area has its own units *individually controlled and metered. No floor space is used.* No ductwork is required. Noise is held to whisper level. And when the Mart proved so successful that Mr. Trammell Crow, owner, decided to double its size, all that was necessary was to add individual units as individual showrooms were added. No fuss—no alterations—no interference with performance of existing units. This is a typical example of how General Electric *factory-assembled* units meet the most exacting air conditioning requirements.

General Electric's complete line is flexible enough to meet every air conditioning requirement for all buildings—large or small—old or new. Ceiling-mounted units water-cooled up to 7½ tons—air-cooled up to 10 tons. Floor-mounted units – water-cooled up to 30 tons—air-cooled up to 20 tons. Steam and hot water coils available for all models. It will pay you to discover how General Electric Factory-Assembled Units can simplify your planning. For full details write: General Electric Company, Commercial and Industrial Air Conditioning Dept., Bloomfield, N. J.

Progress Is Our Most Important Product

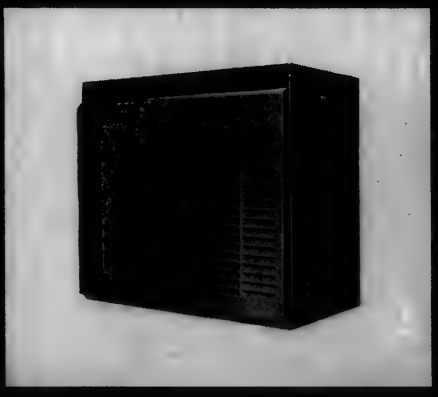
GENERAL ELECTRIC

GLAD

TO HEAR THE EQUIPMENT YOU SPECIFY DELIVERS THE GOODS ON THE JOB? THEN READ THE RIGHT HAND PAGE...

EXCLUSIVE 15 AND 20 TON ACSC

...est packaged air cooled equipment in ... industry. Designed to be roof mounted ... outdoor application. Double circuited ... two sets of compressors and con... one double circuited evaporator ... Factory assembled, piped, charged and ...ally wired. Can be rigged to the roof ... piece. Heating equipment optional.



EXCLUSIVE 10-...
20 TON ACCD

10 tons, or ... tons capacity ... in horizontal ... pairs. ... Rugged ... outdoor ... An ... flow ... heating ... cooling ...

YOU KNOW YOU CAN COUNT ON TYPHOON!

Typhoon adds to your reputation by turning in the kind of performance your clients demand . . . and more! Each and every Typhoon unit is designed and built to stand up to extreme weather conditions and sudden severe temperature changes without strain or breakdown. Typhoon quality begins with Power Reserve—superior components and oversize parts to deliver beyond rated capacity. All copper condensers in water cooled units, largest coil surfaces, and rugged 11 and 14 gauge metal in durable lifetime cabinets. And Typhoon dependability is enhanced by the flexibility of large and small units that can be easily adapted, split or combined to fit any and all installations with maximum ease and economy. Air cooled units from 2 tons to 20 tons, both packaged and as split systems. Water cooled units from 3 tons to 60 tons. Packaged water chillers, 2 tons to 50 tons. Air cooled condensing units to 20 tons, water cooled to 60 tons. For quality, performance, versatility . . . next time specify Typhoon, the industry's most complete line of packaged air conditioners.

TYPHOON
DIVISION OF HUPP CORPORATION

Typhoon Air Conditioning Company
505 Carroll Street, Brooklyn 15, New York

Please send me full product literature on the Typhoon line.

Name_____

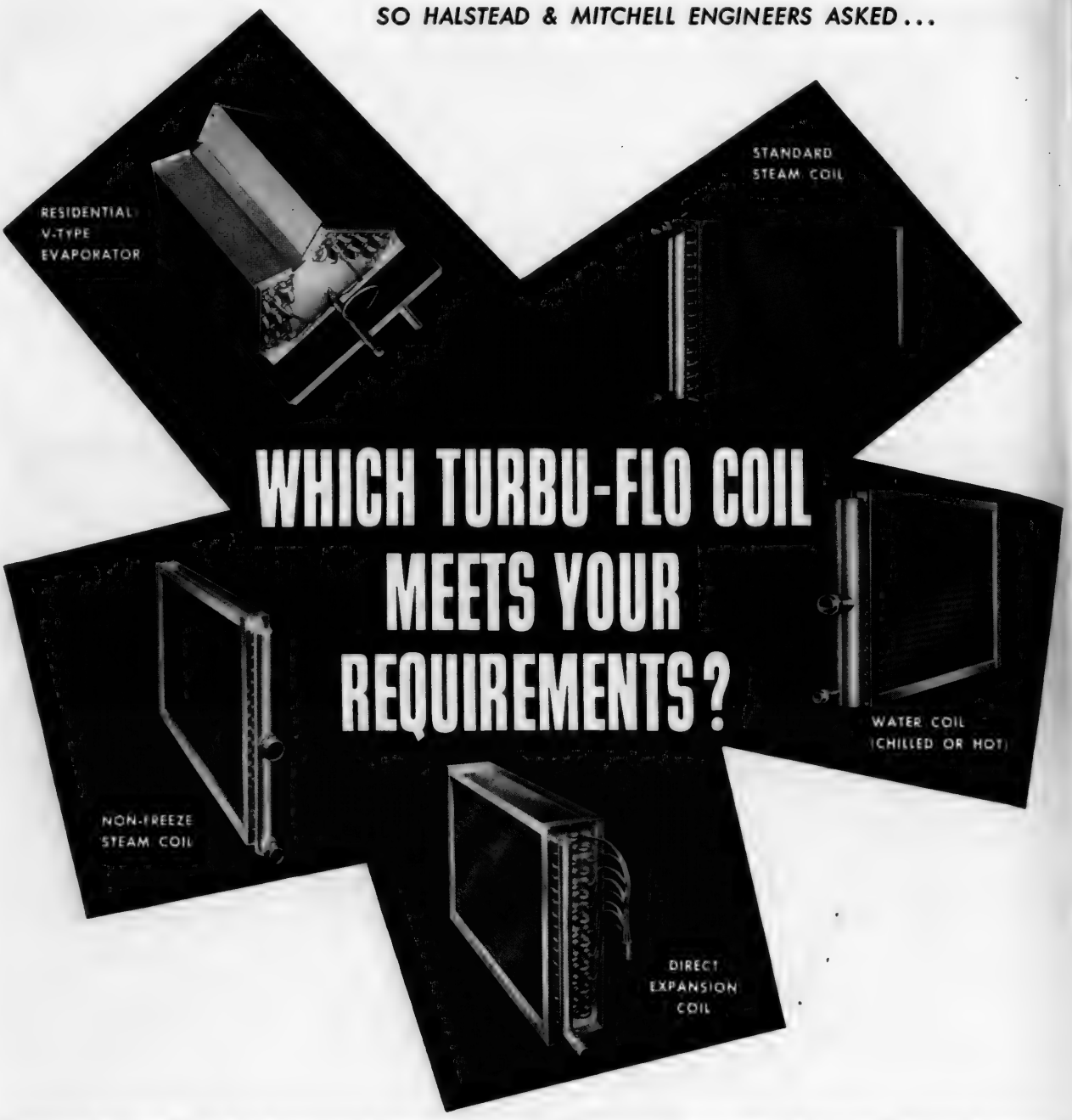
Address_____

_____

City_____ Zone_____ State_____

8C-2

SO HALSTEAD & MITCHELL ENGINEERS ASKED . . .



WHICH TURBU-FLO COIL MEETS YOUR REQUIREMENTS?

Halstead & Mitchell coils with Turbu-Flo fins are designed for rugged and long service life. And Turbu-Flo provides up to 15% more heat transfer capacity.

STEAM COILS are available in both standard and non-freeze types. WATER COILS are for use with chilled or hot water. DIRECT EXPANSION COILS are equipped with a pressure type distributor and circuited for minimum refrigerant pressure drop . . . will accommodate any make expansion valve, refrigerants 12 or 22. All coils are regularly available in from 1 to 8 rows deep, in finned heights of 12 to 36 inches, and in lengths up to 10 feet. Manifolding can be arranged for left, right or opposite-hand connections. Other sizes or special coil types can be provided to meet your specifications.

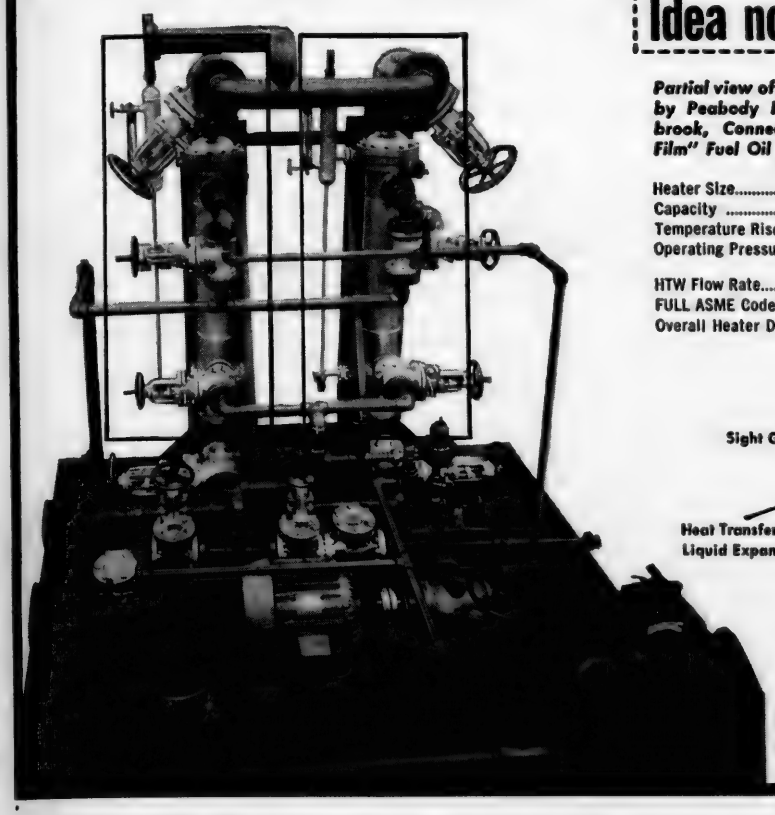
EXCLUSIVE, EFFICIENT TURBU-FLO

All coils feature the exclusive Turbu-Flo fins. Streamline design creates better air wash, lowering air film resistance and improving heat transfer; yet friction is at a minimum. Turbu-Flo fins are made of aluminum (available in copper), mechanically bonded to seamless copper tubing.

Casings are of heavy gauge steel fully protected against corrosion or of heavy gauge aluminum. Surrounding flanges simplify ductwork installation.

Write for more specific information, delivery and prices. *Halstead & Mitchell, Bessemer Building, Pittsburgh 22, Pa.*

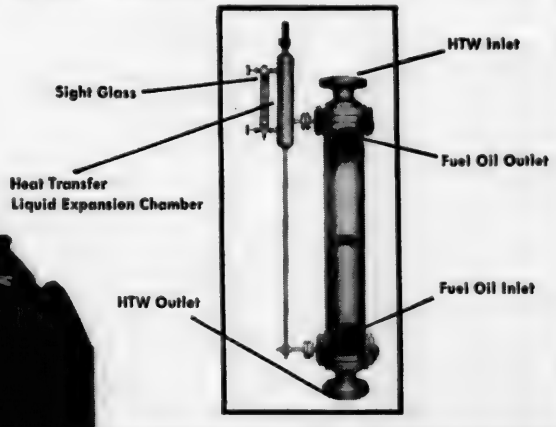
HM Halstead & Mitchell



Idea no. 2 from Paracoil

Partial view of pump and heater set fabricated by Peabody Engineering Corporation, Glenbrook, Connecticut, utilizing two "Thermo-Film" Fuel Oil Heaters of these specifications:

Heater Size	FF-48 HTW "Thermo-Film"
Capacity	7500 lbs. No. 6 oil per hour
Temperature Rise	80°F to 210°F
Operating Pressures	300 psi, water side 315 psi, oil side
HTW Flow Rate	100 GPM at 370°F
FULL ASME Code Construction	
Overall Heater Dimensions	15" x 6'-6"



How to use High Temperature Water directly in a #6 oil heater...without danger of system contamination!

The Problem

The pre-heating of #6 fuel oil with High Temperature Water to provide adequate oil temperature and eliminate possibility of leakage of fuel oil into the HTW stream.

Leakage of fuel oil into the HTW stream would result in contamination of the system and could cause serious and costly damage to the boiler and the entire system.

The isolation of the fuel oil heaters can be accomplished by several methods. For example, the HTW stream may be passed through an evaporator to supply steam for use in a steam-type fuel oil heater. Or, the HTW stream may be passed through an intermediate water-to-water exchanger to heat a secondary water stream circulated through a water-type fuel oil heater.

In both of these systems, the HTW stream is safely isolated from the fuel oil heater by an intermediate secondary circuit. But effective as these methods are, they both require a minimum of two heat exchangers, additional space and additional connecting piping, regulators, level controls, etc.

A New Solution

Now for the first time the Paracoil "Thermo-Film" Fuel Oil Heater furnishes the optimum solution to the problem. **In a single exchanger** the "Thermo-Film" Heater provides adequate oil temperature, isolation of the HTW circuit from the oil circuit, a reduction in space requirements, simplicity of operation and substantially lower initial installation cost. A number of double tube elements are enclosed within the heater shell providing three circuits: the primary HTW circuit, an intermediate heat transfer fluid circuit, and the oil circuit.

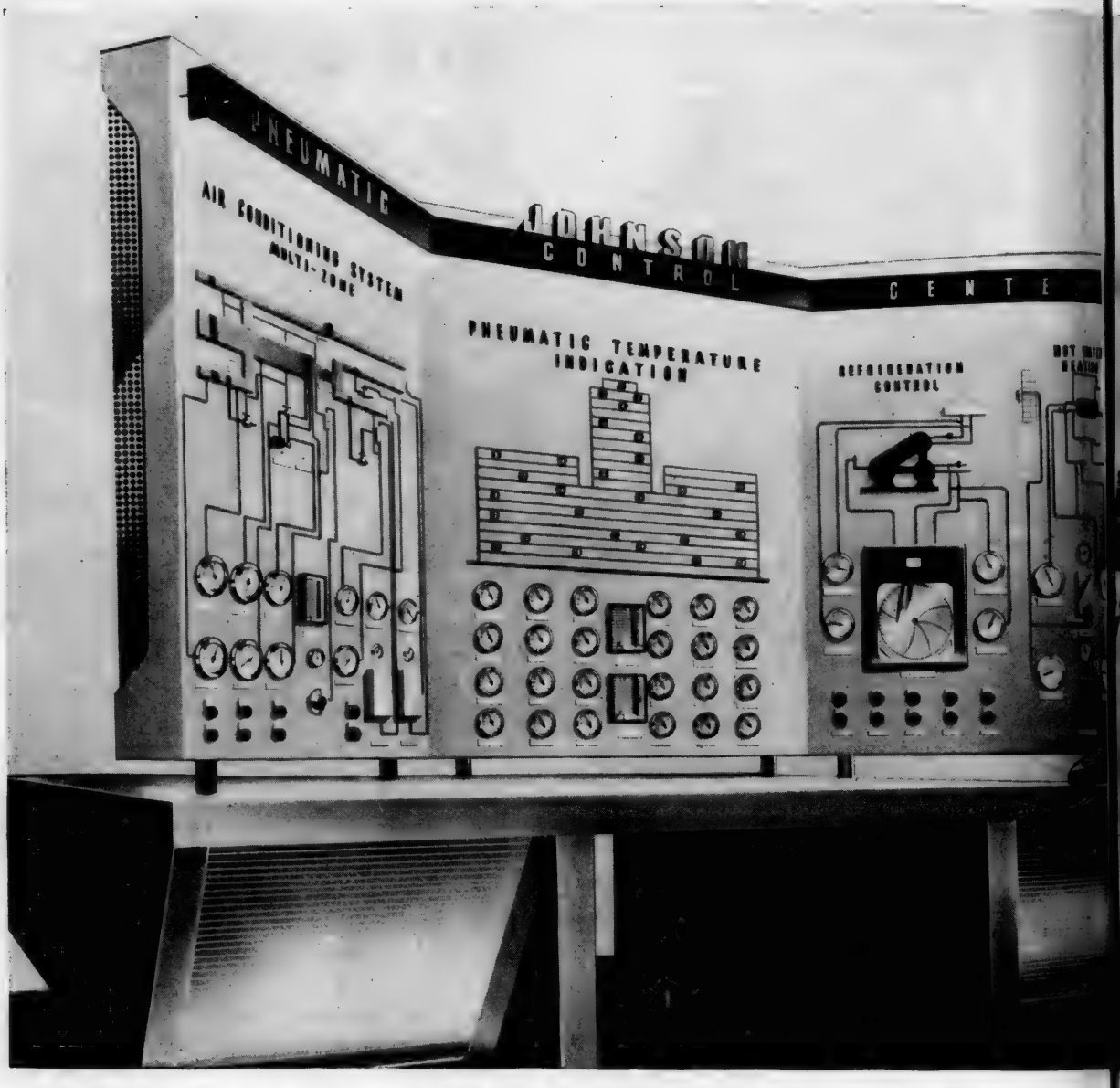
The heat flow path is from the HTW to the heat transfer fluid to the fuel oil. In the rare event of an oil tube failure, the free oil cannot contaminate the HTW stream as it becomes trapped in the intermediate space containing the heat transfer liquid, and gives warning to the operating personnel by rising in the indicating gauge glass at the expansion chamber.

Your inquiries for Paracoil "Thermo-Film" applications to HTW systems are invited.

DAVIS ENGINEERING CORPORATION

30 Rockefeller Plaza, New York 20, New York • Circle 6-5650

CUT ALONG DOTTED LINE AND SAVE



Add the Final Touch of Magic

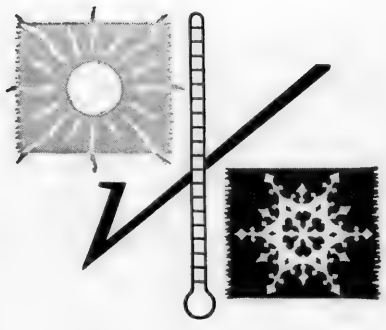
JOHNSON PNEUMATIC CONTROL CENTERS

Perfection of the Pneumatic Control Center by Johnson is bringing major savings in heating and cooling costs as well as greatly improved temperature control to buildings of all types and sizes.

The Johnson Pneumatic Control Center gives the building engineer *centralized* supervision and regulation of the air conditioning and heating system. It provides him with a *continuous,* comprehensive visual display of all the vital operating data necessary to maintain the exact temperature conditions required. Simultaneously, it assures that all components of the system constantly function at peak efficiency.

A GLANCE TELLS ALL

By simply scanning the panel, for example, the operator can check space temperatures and water and air supply temperatures at strategic control points throughout the system. *Equally important, he can make any necessary adjustments of key temperatures instantly, right at the panel!*



Sizes, layouts and styles of Johnson Pneumatic Control Centers depend upon the specialized needs of the individual building. Each is planned separately with the building's engineer and architect.

to Your Air Conditioning!

ONE MAN DOES EVERYTHING

Thus, the operation of even the most complex air conditioning and heating systems is reduced to a one-man job! Instead of an operating *crew* checking performance and making adjustments at widely scattered locations, one man does it all from the panel! In effect, he can be in 20 or 30 or more places at once!

This coordinated, unerring control assures a uniformly ideal environment to meet every comfort and work requirement of any modern building. It results in large reductions in fuel and power consumption and prolongs equipment life.

Remarkably easy to understand and operate, the Pneumatic Control Center requires no extensive study or training. Its components are as simple and inexpensive to use and maintain as the pneumatic controls used elsewhere in the building. Dramatic styling adds an exciting architectural asset when the Center is located in public view.

ECONOMIC ADVANTAGES IMPRESSIVE

What the Pneumatic Control Center means in terms of greater comfort, manpower savings and more efficient heating and air conditioning performance is obvious. It not only pays for itself in a hurry, but it keeps right on paying off over the life of the building!

Pace-setting Johnson Pneumatic Temperature Control Systems with Control Centers are now being installed in many of the nation's finest offices, stores, hotels, hospitals, industrial plants, schools and public buildings. Before you build or modernize, ask your local Johnson branch for full details or write Johnson Service Company, Milwaukee 1, Wisconsin.

JOHNSON CONTROL

PNEUMATIC SYSTEMS

DESIGN • MANUFACTURE • INSTALLATION • SINCE 1885

Perfect Air Diffusion in the Truman Library with ANEMOSTAT AIR DIFFUSERS *and* WATERLOO GRILLES

Here is a combination—Anemostat Air Diffusers and Waterloo Return Air Grilles—which insures perfect air diffusion in the new Harry S. Truman Library in Independence, Missouri. • Anemostat Type E-1 *Aspirating* Air Diffusers provide true draftless comfort and uniform air distribution in each room of this modern building. Quality-designed Waterloo Grilles act as efficient returns in this system. • Put this performance-proved "team" of Anemostat Air Diffusers and Waterloo Grilles to work in your next heating, ventilating or air conditioning application. They are your assurance of top air diffusion performance.

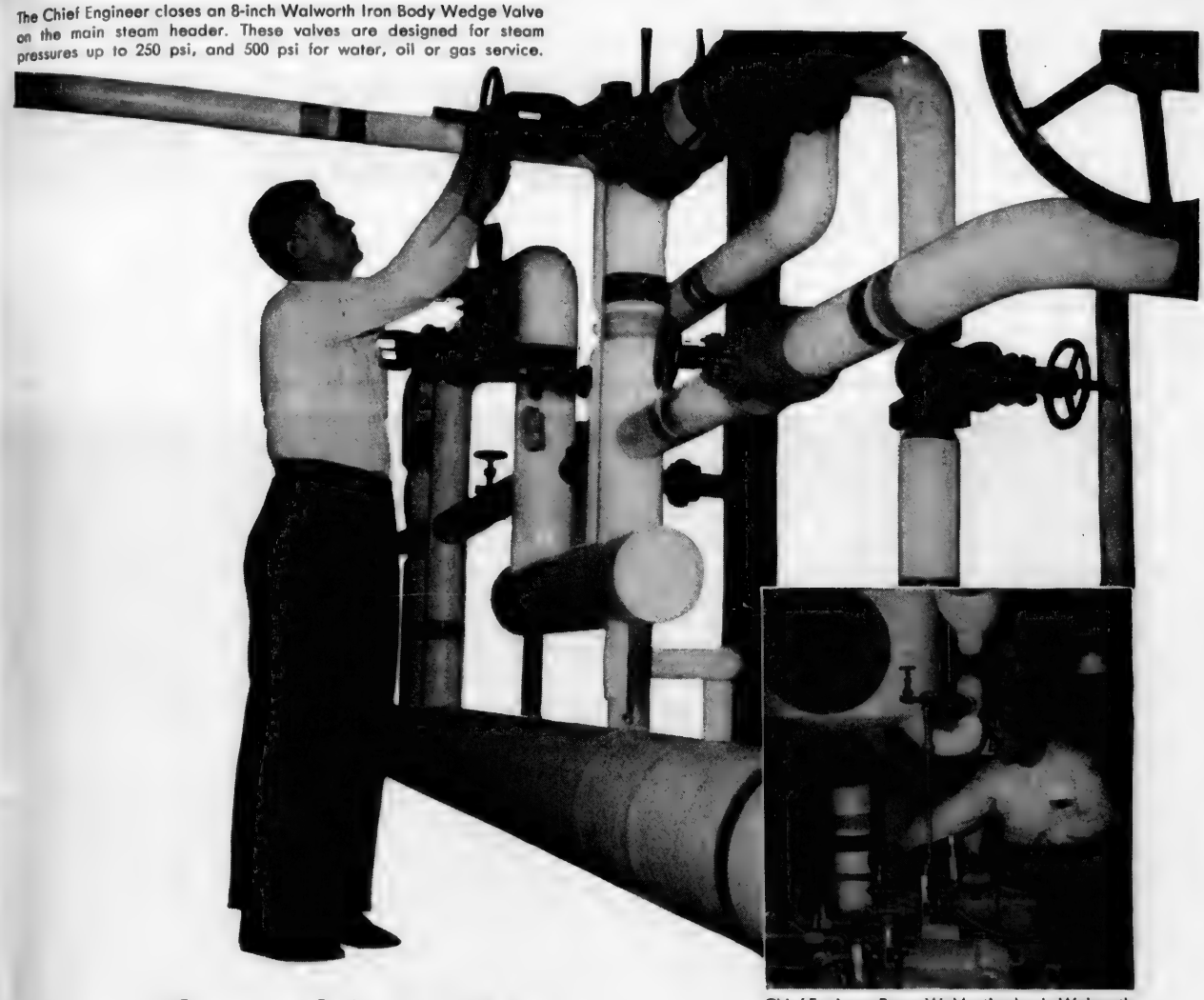
For complete data on Anemostat Air Diffusers, write for Anemostat Selection Manual No. 60.

For helpful information on Waterloo Registers and Grilles, write for Catalog showing Waterloo's wide range line.

ANEMOSTAT®
DRAFTLESS *Aspirating* AIR DIFFUSERS
ANEMOSTAT CORPORATION OF AMERICA
10 EAST 39TH STREET, NEW YORK 16, N. Y.
Representatives in Principal Cities

WATERLOO
REGISTER COMPANY, INC.
WATERLOO, IOWA
REGISTERS • GRILLES • VOLUME
CONTROL DAMPERS • DOOR VENTILATORS

The Chief Engineer closes an 8-inch Walworth Iron Body Wedge Valve on the main steam header. These valves are designed for steam pressures up to 250 psi, and 500 psi for water, oil or gas service.



Chief Engineer Bruce W. Martin checks Walworth Bar Stock Valves in chemical feed pump lines to boiler and feed water. These carbon steel valves are built for ratings up to 3000 psi. Stainless steel bar stock valves are also available for very severe service.

"from big gates to little globes"...

The power plant at the Michigan School for the Deaf has an operating capacity of 25,000 lbs. per hour generated by three 200 hp and one 60 hp oil-fired boilers. Built four years ago, the plant is now the responsibility of Chief Engineer Bruce W. Martin who says: "This plant was designed and constructed for efficient operation, and a lot of that efficiency depends on the valves. From big gates to little globes installed here, we use a wide variety of Walworth Valves. They give us the dependable, trouble-free service we want and expect. I would recommend them to anybody for similar service."

Walworth's complete lines of valves are built to provide long range service and savings. There's a Walworth Valve in a type, size, and material to serve you . . . Gate, Globe, Angle, Check, and Lubricated Plug Valves in a variety of pressure ratings. The next time you need valves or have a problem concerning flow control, call your Walworth Distributor, or, write Walworth direct.

WALWORTH

60 EAST 42nd STREET, NEW YORK 17, N.Y.

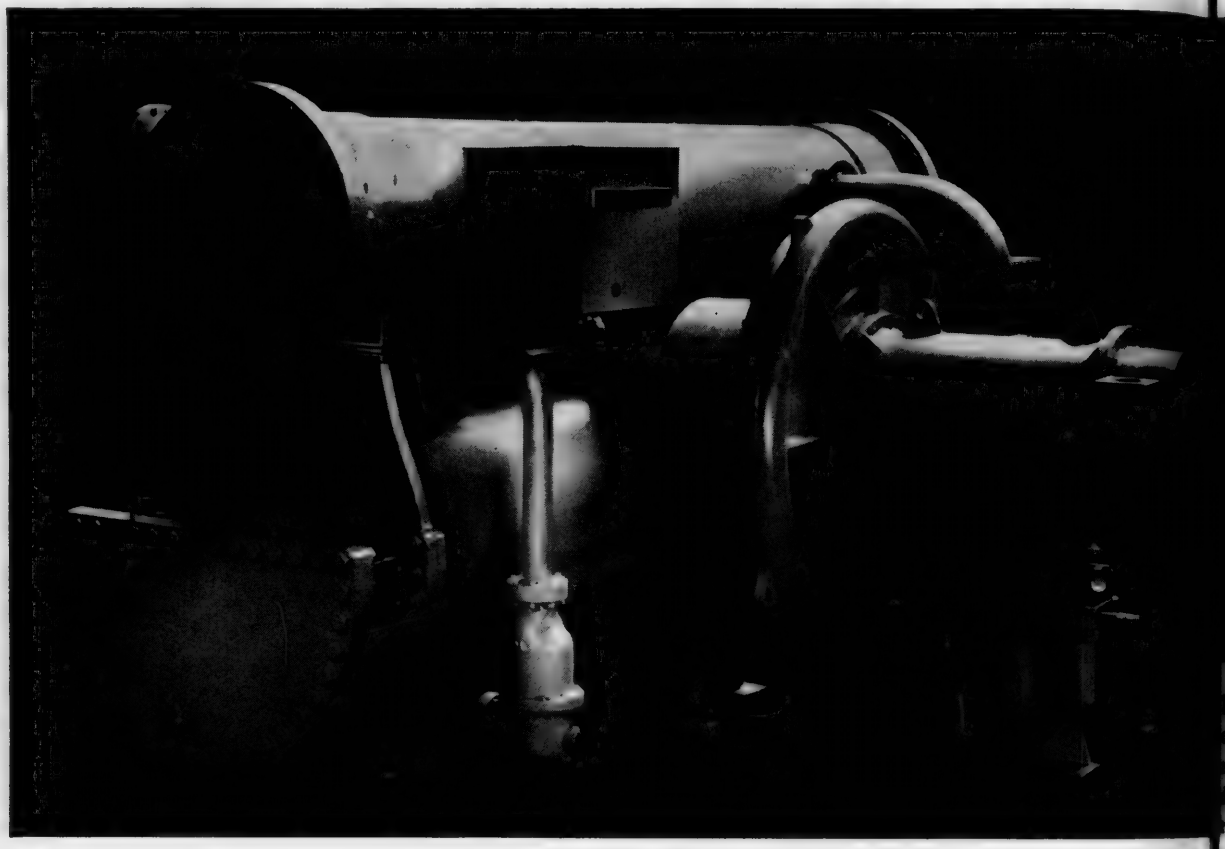
DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

WALWORTH SUBSIDIARIES: ALLOY STEEL PRODUCTS CO. • CONOFLOW CORPORATION • GROVE VALVE AND REGULATOR CO. M&H VALVE & FITTINGS CO. • SOUTHWEST FABRICATING & WELDING CO., INC. • WALWORTH COMPANY OF CANADA, LTD.

FOR AIR CONDITIONING EQUIPMENT FOR ANY JOB

GET A BID FROM

CENTRIFUGAL REFRIGERATION MACHINES



American Blower Tonrac® maintains constant chilled water temperature . . . regardless of load. Its advanced single stage design and hermetic construction provide improved performance and quieter operation. TONRAC comes as a compact, self contained unit, easier and less costly to install with its single level construction.

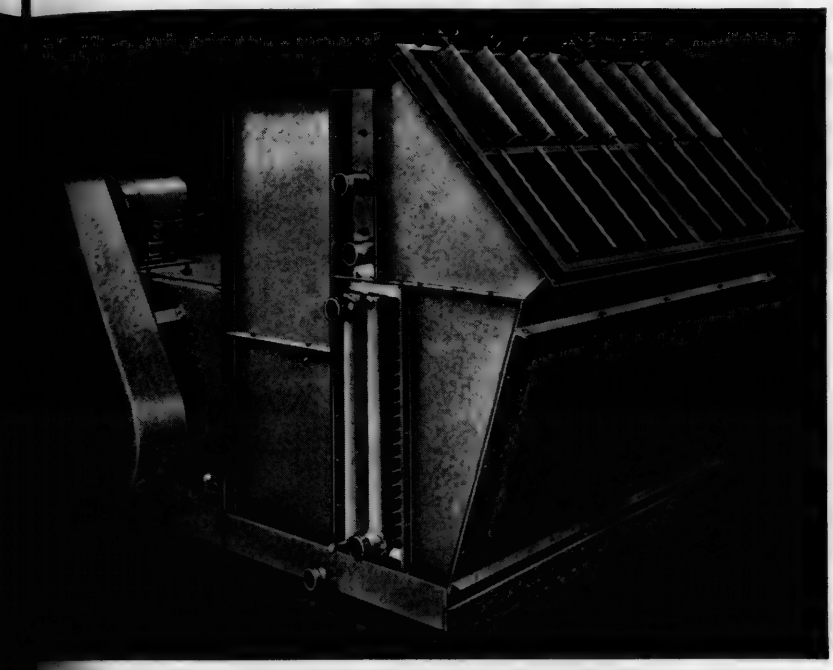
You can pinpoint responsibility for equipment performance, delivery dates, user satisfaction on *any* air conditioning system you plan by using American Blower equipment . . . the *complete* line that's designed, engineered, and manufactured to work together.

Remember, when you think in terms of American Blower, you think in terms of a manufacturing organization that supplies mor of the vital components for air conditioning refrigeration, heating, and ventilating, tha any other in the world.

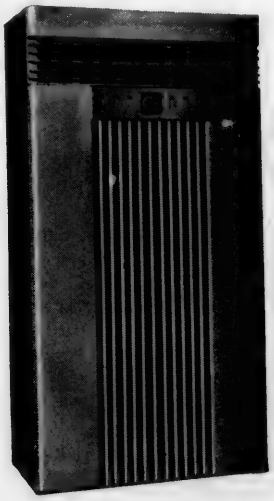
And 73 branch offices offer local produc help or nationwide sales-service coordinatio Call *your* American Blower man. In Canad Canadian Sirocco products, Windsor, Ontari

AMERICAN BLOWER!

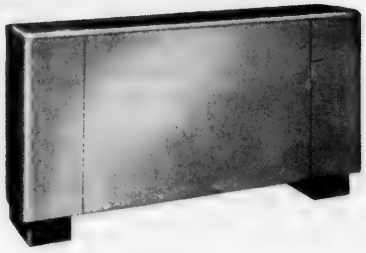
ALL COMPONENTS FOR ANY TYPE OF SYSTEM



Type AB Multi-Zone Unit is in line arrangement for either horizontal or vertical air flow. A diffusion section is furnished between the fans and coils to distribute the air evenly over the entire face of the cooling and heating coils.



Packaged Air Conditioners — sizes from 3 to 20 tons; sound-insulated — a unit for every business! Air or water cooled models, for use with or without ductwork.



New Fancoil Units cool or heat individual rooms in multi-room structures. Operate on "flo-thru" principle. Save space — only 9¼" deep. Vertical or horizontal mountings.

Inductor Units for cooling or heating multi-room buildings. Can be connected in series. Mounted vertically or horizontally (without excessive casing depth). Wide range of sizes.

For further information, write: American-Standard,* American Blower Division, Detroit 32, Michigan

*American-Standard and Standard® are trademarks of American Radiator & Standard Sanitary Corporation.

AMERICAN-Standard
AMERICAN BLOWER DIVISION

Chicago's Board of Trade Building uses ALLEN-BRADLEY CONTROL for its Air-Conditioning System

When your air-conditioning specifications read *"Motor Control by Allen-Bradley,"* you automatically assure yourself of many *years* of trouble free service. That's the reason why Allen-Bradley . . . the *quality* motor control . . . is specified for so many of today's larger and more important air-conditioning installations.

The simple solenoid design—which *only* Allen-Bradley has available in starters up through Size 7—uses only *one* moving part. There are no pins or bearings to stick and cause trouble . . . no flexible jumpers to wear and break. Also, the double break, silver alloy contacts—standard throughout the Allen-Bradley line—never need servicing of any kind. You can install Allen-Bradley motor control . . . and forget it!

Standardize on Allen-Bradley motor control—a decision you should make in your own interest. Its reliability—which is universally recognized—costs you no more. Send for A-B Handy Catalog, today.

Allen-Bradley Co., 1330 S. Second St., Milwaukee 4, Wis.
In Canada—Allen-Bradley Canada Ltd., Galt, Ont.

ALLEN-BRADLEY
QUALITY
MOTOR CONTROL

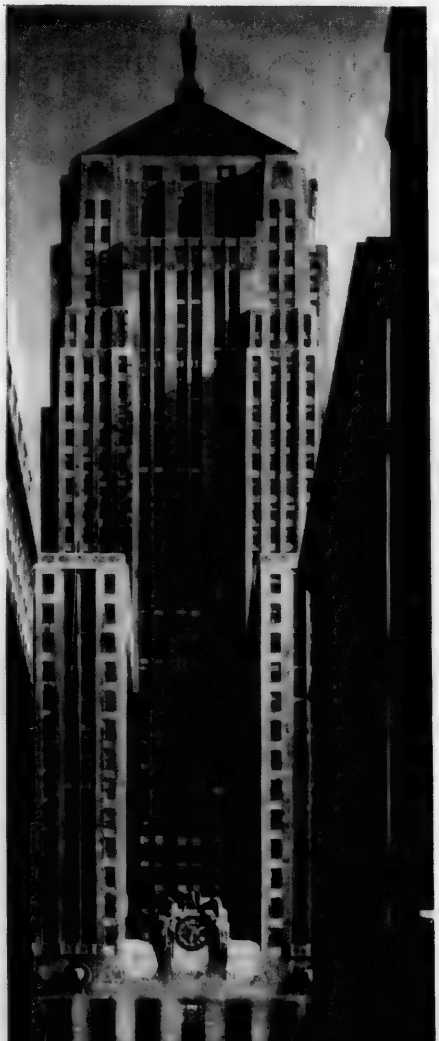
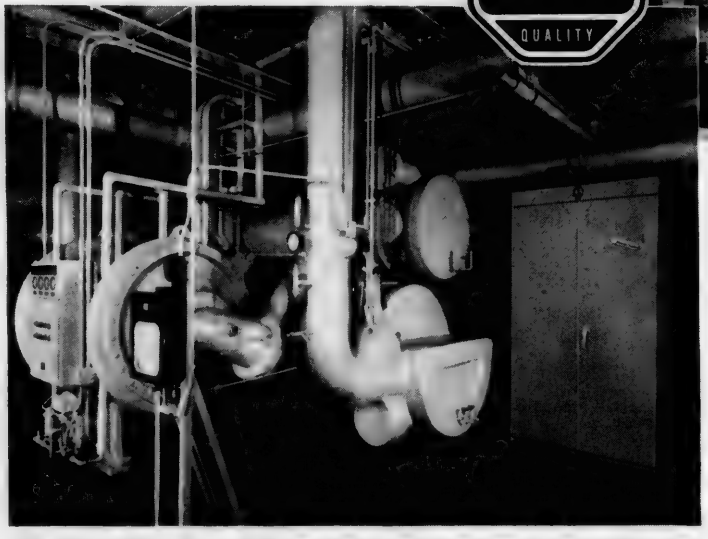
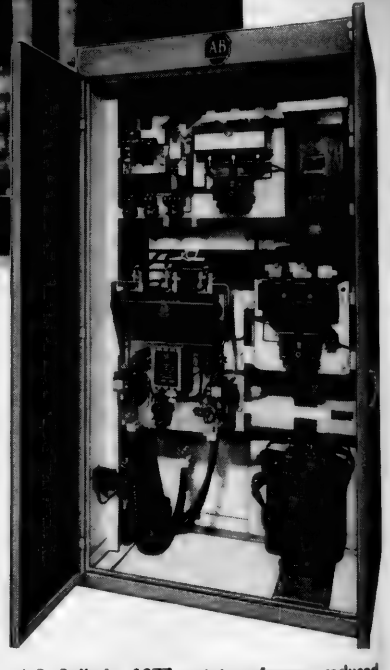


Photo Courtesy of Hedrich-Blessing

A-B QUALITY

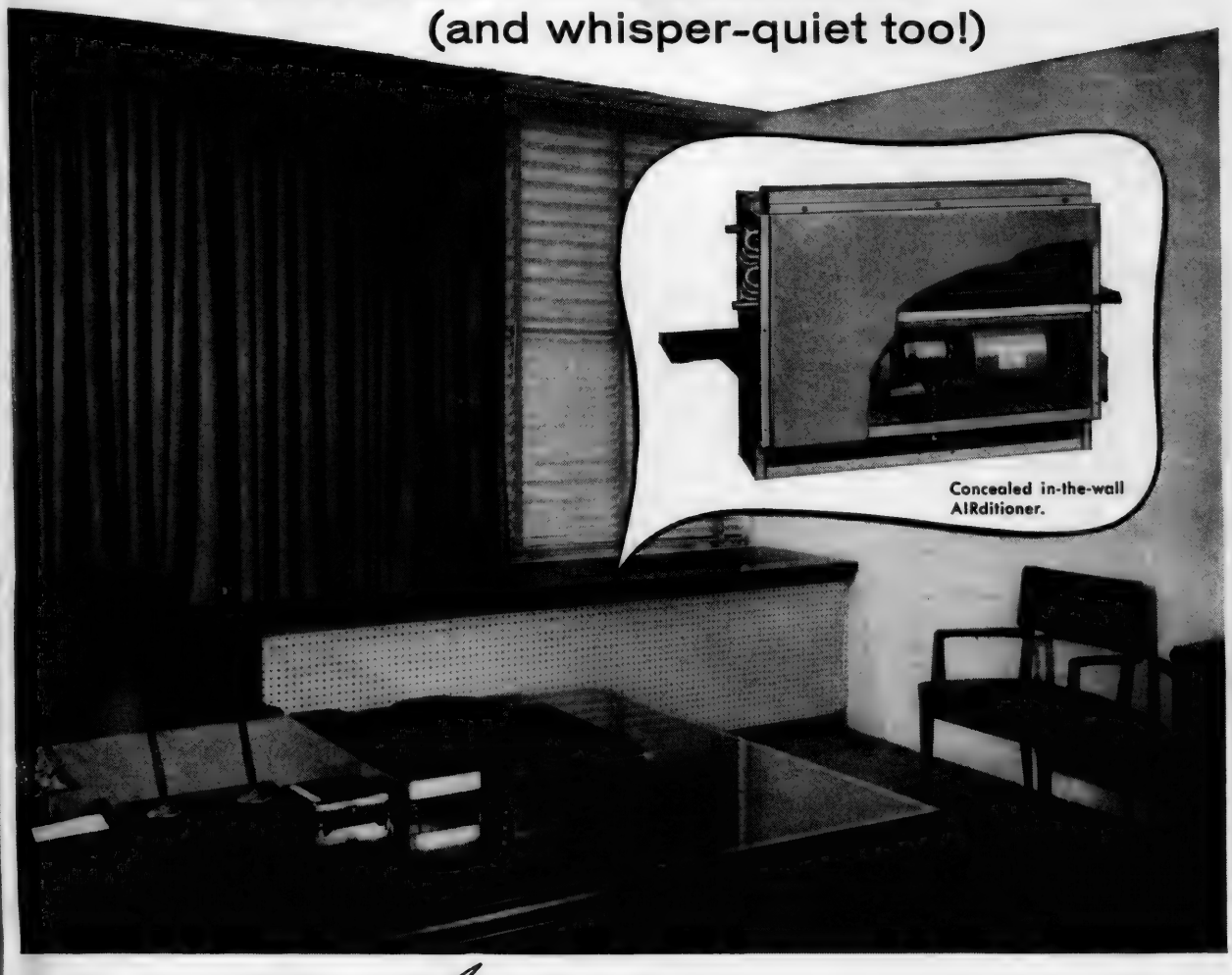


This 400-ton Trane air-conditioning unit is the first of four to be installed. Each will have an A-B Bulletin 1277 starter to operate the 440 v compressor motor. *Consulting Engineers:* Brooke & Choporis. *Air-Conditioning Contractors:* Gallaher & Speck. *Elec. Contractors:* Henry Newgard & Co. *Managing Agents:* Hogan & Farwell.



A-B Bulletin 1277 autotransformer reduced voltage starter used on the Chicago Board of Trade job. It has closed circuit transition with current limiting acceleration, and uses an I.T.E. circuit breaker for disconnecting.

Concealed comfort
(and whisper-quiet too!)



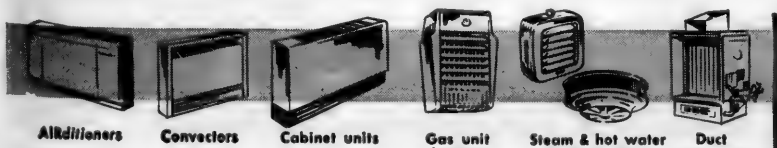
Modine Airditioners provide year-round, individual-room climate control

Out of sight... out of mind! Yes, after you install this Modine AIRditioner, there's nothing left to do but enjoy the personalized comfort it provides. From its concealed position, it quietly and efficiently heats, cools and dehumidifies . . . according to your exact needs.

Quiet operation results from resiliently suspended, slow-speed fan — 1050 rpm. True counter-flow coil maintains peak efficiency. And a permanently lubricated, sealed-bearing motor contributes to low-cost maintenance.

AIRditioners give you all the inherent benefits of a fan-coil unit air conditioning system. They cool with chilled water, heat with hot water — from a central source. And they can be installed with ease in both new or existing buildings.

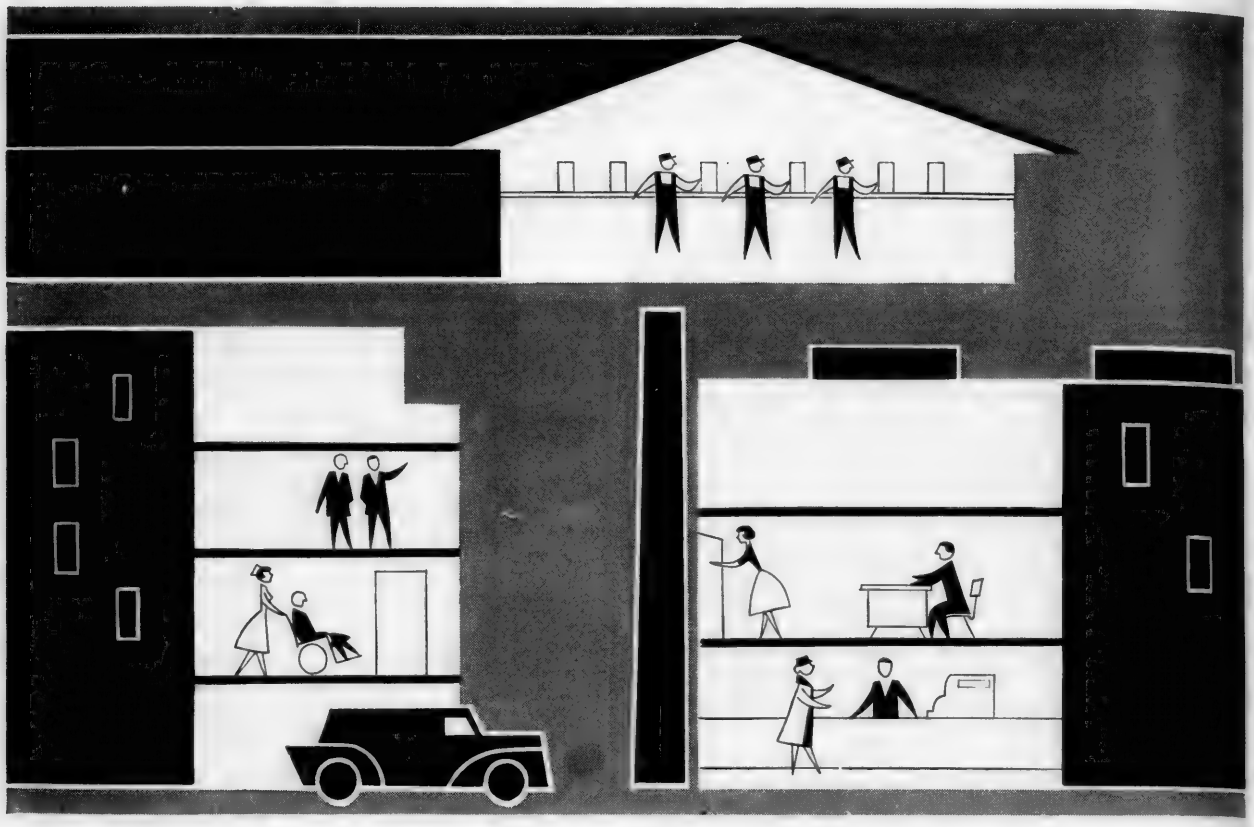
GET FULL DETAILS on Modine's *complete line* of AIRditioners . . . console, ceiling and concealed overhead and in-the-wall (illustrated above) types — ⅓ to 2 tons. See the Modine representative listed in the yellow pages of your phone book. Or write for Bulletin 757 to Modine Mfg. Co., 1511 DeKoven Ave., Racine, Wisconsin.



In Canada: Sarco, Ltd., Toronto

A-1364

Modine
MANUFACTURING COMPANY



Which Crane boiler would you specify for these buildings?

You'd have to know many vital facts about the factory, hospital, and office building above before you could specify the correct boilers.

But our point is this: whatever the specific heating requirements of a building, there's a rugged Crane Sunnyday Boiler to meet them. Hot water and steam models . . . gas, oil, and coal . . . with capacities from 280,000 to 4 million Btu/hr. gross output.

There are many sound reasons for specifying Crane Sunnyday boilers. Here are just a few: Crane offers more gas-fired boilers in commercial sizes than anyone in the industry . . . assuring a closer sizing of the boiler to load requirements. These boilers also offer universal burners that provide equal ratings on all gases.

Before you make your next bid, why not check with your Crane Branch or Crane Wholesaler on all your heating requirements.

Crane Sunnyday 30—300,000 to 1,367,000 Btu/hr.

Crane 41 Boiler—829,000 to 2,349,000 Btu/hr.

Crane Sunnyday 40—280,000 to 1,904,000 Btu/hr.

Crane Sunnyday 60—500,000 to 4,000,000 Btu/hr.

CRANE

QUALITY HEATING AND COOLING

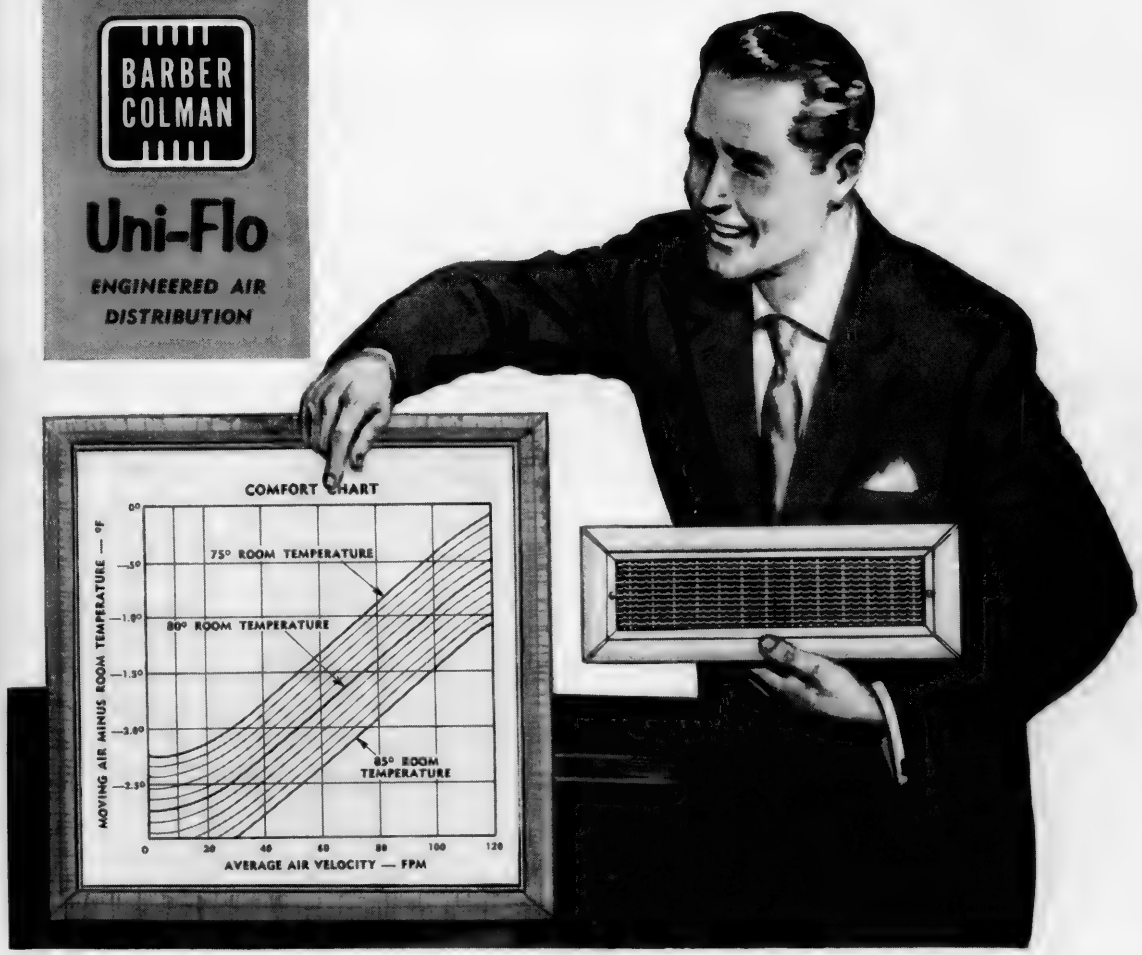
CRANE CO. 836 S. Michigan Ave., Chicago 5 • VALVES • FITTINGS • PIPE • PLUMBING • KITCHENS • HEATING • AIR CONDITIONING

THE MARK OF QUALITY

BARBER COLMAN

Uni-Flo

ENGINEERED AIR DISTRIBUTION



"Precision-controlled* air distribution from sidewalls? Only through Barber-Colman's true sidewall diffusers."

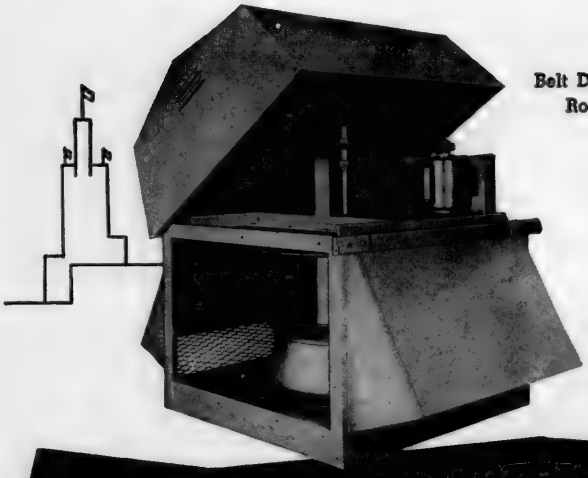
Precision air distribution from sidewalls ceases to be a problem when you specify Barber-Colman Uni-Flo Sidewall Diffusers — designed to give adjustable air patterns and rapid diffusion without harmful airstream drop — *a true diffuser*, not merely a grille.

*The Barber-Colman *Comfort Chart*, above, shows proper relation between air velocities and air temperatures important to human comfort. Each curve represents limit of satisfactory conditions for an average room temperature — points above the line fulfill Human Comfort Standards. Tools like this chart, developed by Barber-Colman engineers, and Uni-Flo Sidewall Diffusers help you define and deliver ideal results. The surest, easiest way is with *combined* Barber-Colman Air Distribution and Automatic Controls.

Request Uni-Flo Diffuser Catalog and other details from your nearby Barber-Colman Field Office or write . . .

BARBER-COLMAN COMPANY

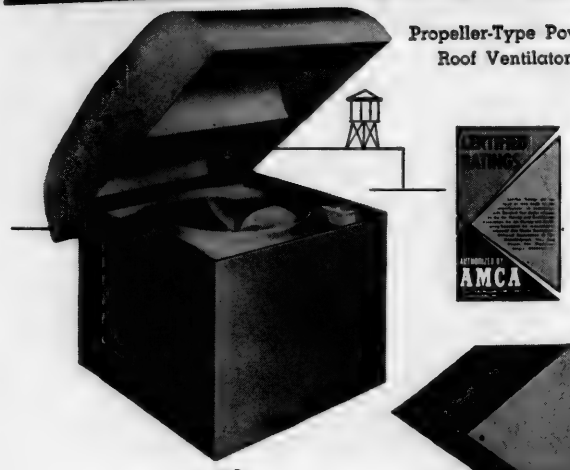
Dept. C, 1102 Rock Street, Rockford, Illinois



Belt Drive Centrifugal
Roof Ventilator

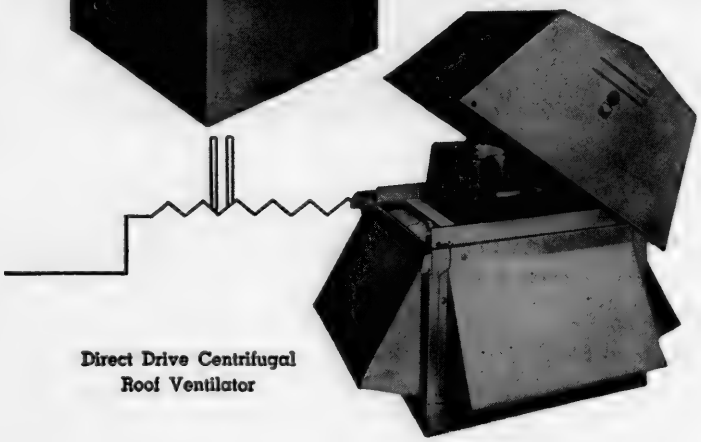
Recommended for their high quality, ease of installation, low maintenance cost, trouble-free operation, space-saving features, and blower-like performance.

Peerless Electric Roof Ventilators . . .



Propeller-Type Power
Roof Ventilator

Peerless Electric Roof Ventilators offer engineers, architects, contractors and users AMCA rated units that embody sturdiness, high performance ratings, and low noise levels. They are particularly suited for public buildings, industrial plants, hospitals, churches, schools, and other similar applications.



Direct Drive Centrifugal
Roof Ventilator

Sizes range from 12" to 60" wheels; 640 to 45,000 c.f.m., depending upon the unit selected. Peerless Electric Roof Ventilators are built of 16 gage steel, or heavier, to last the life of the building. They fit all standard curb sizes. Matching wheel cones accurately fit venturi inlet for quieter operation . . . smoother air movement.

Write for Complete Line Catalogs

A COMPLETE LINE OF AIR MOVING EQUIPMENT

Charter Member of the Air Moving and Conditioning Association, Inc. (AMCA)

FAN AND BLOWER DIVISION

THE Peerless Electric® COMPANY

1400 W. MARKET ST. • WARREN, OHIO

FANS • BLOWERS • ELECTRIC MOTORS

Peerless Electric®

SEE OUR CATALOG IN SWEET'S

New Electric Resistance-Weld Pipe Mill

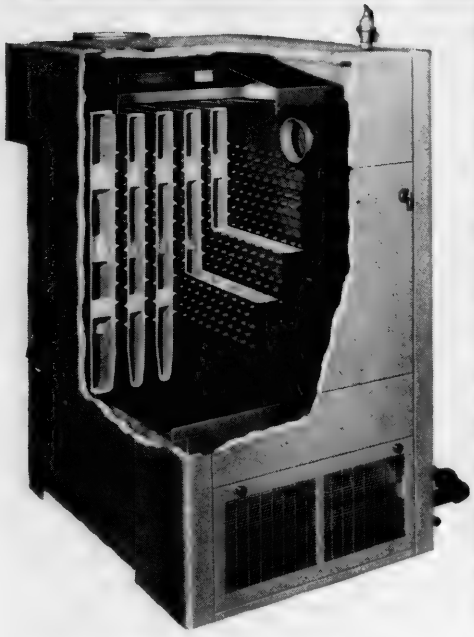
This new mill produces plain end or threaded and coupled steel pipe in sizes from 5 in. nominal through 16 in. OD, in lengths to 60 ft.

BETHLEHEM STEEL

BETHLEHEM STEEL

WEIL-McLAIN TYPE "J" CAST IRON GAS BOILERS

MATCH MODERN DESIGN WITH MODERN EFFICIENCY



Installation of Weil-McLain Type J-18-W Gas Boilers in A. F. L. Medical Center Building, Philadelphia, Pa.

Architect:
Louis J. Kahn, Philadelphia, Pa.

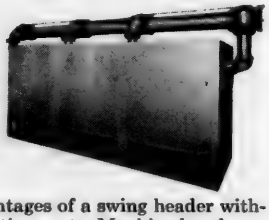
Mechanical Engineer:
A. Ernest D'Ambly, Philadelphia, Pa.

Mechanical Contractor:
Edward F. Roberts Co., Philadelphia, Pa.

Distributor:
Peerless Penna. Co., Philadelphia, Pa.

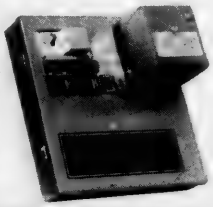
NEW FEATURES!

EASY-FIT HEADER



Assures correct header piping for proper steam development and release. Equipped with Dresser compression fittings—offers all the advantages of a swing header without the added erection costs. Machined and prefitted at the factory—shipped partially assembled, with all parts clearly marked for easy erection.

ELECTRONIC CONTROL PANEL



Reduces electrical work to a minimum. With its compact grouping of identified components, visual indication of operation and easily understood operating instructions, this electronic control assures lower installation cost and correct operation of the boiler.

The selection of Weil-McLain Type "J" Gas Boilers for this installation assures heating efficiency as outstanding as the modern styling of the building.

In every detail, the "J" Boiler is designed to achieve *economy!* Not only in fuel consumption but in all the factors which contribute to low cost operation.

This boiler is *cast iron*—for long life and minimum repairs and maintenance. It is *compact*, requiring less floor space and head room. Assembly with short, multiple draw rods shortens erection time—assures a strain-free boiler. Its handsome jacket is completely insulated.

The Weil-McLain Type "J" Boiler burns all gases, including LP and LP-air and is equipped with controls for completely automatic, safe operation.

WEIL-McLAIN BOILERS · RADIATORS

WEIL-McLAIN COMPANY
MICHIGAN CITY, INDIANA

Address literature requests to Dept. BB-38

FICTION FACT

FICTION:

Removal of odors from the air requires bulky, expensive equipment—necessitating larger fans and motors to overcome resistance.

FACT:

R P Super Filter Coat, applied to R P Aluminum Filters, automatically removes both dust *and odors*, with no increase in resistance, no decrease in efficiency.

RP

Multi-Velocity Industrial AIR FILTERS

When you specify R P Industrial Filters, you gain the tremendous advantage of inexpensive, automatic odor-removal through the use of R P Super Filter Coat water soluble adhesive. Odors are actually removed from the air stream by absorption, held by the adhesive, and prevented from re-circulating. It is *NOT* a simple masking process—it's true, positive odor-removal. And this important odor-removing function is, of course, a plus feature—in addition to effective dust removing properties and the like-new efficiency restored to the filter after washing and re-coating.

Permanent-type light weight, rugged, aluminum R P Industrial Filters have other advantages too. Their light weight makes them easier to handle and wash; eliminates heavy structural design in filter bank construction; reduces operating and maintenance costs through longer service life and easier handling. Write for complete information on the benefits of R P Industrial Air Filters.

RP *Products of Research*

RESEARCH PRODUCTS *Corporation*

Dept. 47, Madison 10, Wisconsin

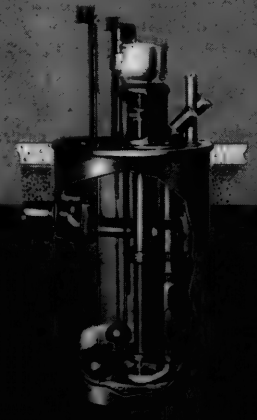
from Chicago

THE 'INSIDE' STORY IS IMPORTANT TOO!

SOCONY MOBIL BUILDING
NEW YORK, NEW YORK

ARCHITECTS: Harrison-Abramovitz and John B. Peterkin • GENERAL CONTRACTOR: Turner Construction Company, New York, New York • PLUMBING CONTRACTOR: Eugene Duklauer, Inc., 215 E. 38 Street, New York, New York • MECHANICAL ENGINEERS: Jaros, Baum and Bolles, 415 Lexington Avenue, New York, New York • PHOTO: Wurts Brothers, 15 East 40th Street, New York, New York

"FLUSH KLEEN"® Sewage Ejector . . . Automatically Backwashes Strainer . . . Strainer Keeps Solids From Basin And Pump . . . Water Only Handled By Impeller



The whole story of a modern skyscraper is not limited to striking architecture and gleaming exterior. Of equal importance is the equipment within the building that provides for comfort of the occupants and efficiency of the building operation.

In fine buildings everywhere, like New York's Socony Mobil Building, the Chicago Pump Company "FLUSH KLEEN"® Sewage Ejector is standard equipment because it is the only true clog proof ejector. More than 12,000 have been installed and not one has clogged.

In the "FLUSH KLEEN"® Sewage Ejector only liquid reaches the pump impeller. There is no contact between the ejector's working parts and coarse sewage material.

This is why the Chicago Pump Company "FLUSH KLEEN"® Sewage Ejector has an unequalled record of clog proof performance and is preferred throughout the building industry.

CHICAGO PUMP COMPANY
Building Pumps

Subsidiary of Food Machinery & Chemical Corporation

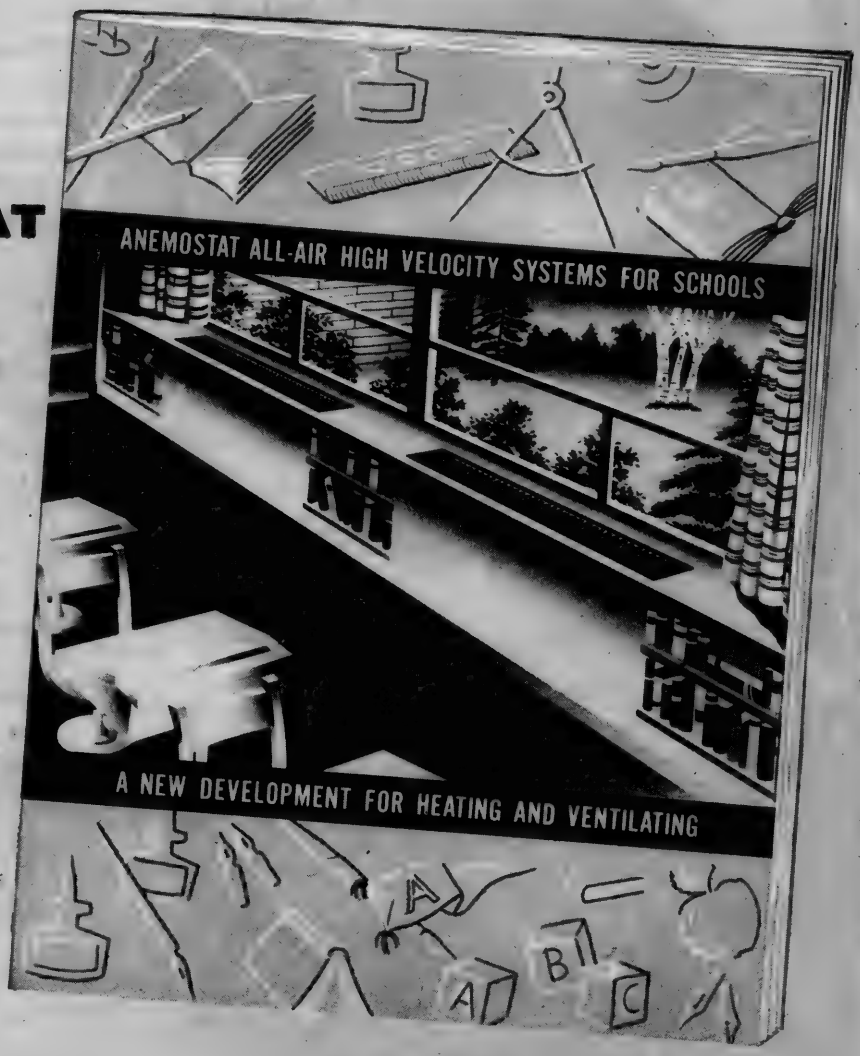
fmc

622 Diversey Parkway
Chicago 14, Illinois

Are you building a new school or renovating an old one?

New ANEMOSTAT SCHOOL CATALOG

contains *necessary* application and selection data



ANEMOSTAT®

DRAFTLESS *Aspirating* AIR DIFFUSERS

ANEMOSTAT CORPORATION OF AMERICA

10 EAST 39TH STREET, NEW YORK 16, N. Y.

Representatives in Principal Cities

AD-5388

↓ JUST CLIP AND MAIL

ANEMOSTAT CORPORATION OF AMERICA

10 E. 39TH STREET, NEW YORK 16, NEW YORK

Gentlemen:

Please send me, without obligation, a copy of your new School Catalog.

Name..... *Position*.....

Company .....

Address.....

City..... *Zone*..... *State*....

A "bosun" showed us where we were missing the boat

We were just wrapping up a Personnel-Relations meeting when the head of Marine Transportation spoke up. "A crewman aboard the *Melissa* wants to have U.S. Savings Bonds deducted from his pay. Can do?"

It was a significant question. If one employee didn't know he could buy Savings Bonds automatically through our Payroll Savings Plan, there were likely to be others. We planned a course of action.

And we did it the easy way.

We got in contact with our State Savings Bond Director. He suggested ideas for promoting the Payroll Savings Plan and provided the necessary materials—pay envelope stuffers, posters, leaflets . . . the works. And he made sure everyone received an application card.

Our employee participation rocketed. We never realized how many of our people wanted the security of U.S. Savings Bonds. The Payroll Savings Plan makes it so easy for them to salt a little away, and it's so simple to make it available.

Today there are more Payroll savers than ever before in peace time. Look your State Director up in the phone book or write: Savings Bonds Division, U.S. Treasury Dept., Washington, D. C.

AIR CONDITIONING, HEATING & VENTILATING

THE U. S. GOVERNMENT DOES NOT PAY FOR THIS ADVERTISEMENT. THE TREASURY DEPARTMENT THANKS, FOR THEIR PATRIOTISM, THE ADVERTISING COUNCIL AND THE DONOR ABOVE

TEVA*...best way to compare pipe insulations

Recently a company building a new plant asked us questions about Snap*On, the one-piece pipe insulation of fine glass fibers that simply snaps on pipe. How would 1½" thick Snap*On compare thermally with 2" of another insulation? What effect would it have on material costs? . . . on operating costs?

Our answers were contained in the following TEVA* report:

*Thermo-Economic Value Analysis

PURPOSE . . . to compare Snap*On with Insulation "A".

BASIS OF COMPARISON . . . 15,000 lin. ft. of 8" (average size) pipe
Average Pipe Temperature—350° F
Annual Operating Time—7200 hrs.
Cost of Heat—$0.50/million Btu
Heat Loss Values—Published by manufacturers

CONCLUSIONS

A. HEAT LOSS (Btu/Lin. Ft./Hr.)

Insulation "A", 2" thick	132
SNAP*ON Pipe Insulation, 1½" thick	98
SNAP*ON Savings (Btu/Lin. Ft./Hr.)	34

B. ANNUAL SAVINGS—$ OPERATING COSTS

15,000' x 34 Btu x 7200 Hrs. = 3,672,000,000 Btu
$0.50 (per million Btu) x 3.672 = Annual Saving of $1,836

C. INITIAL SAVINGS—MATERIAL COST

2" Insulation "A", 15,000 lin. ft. @ $2.08	$31,200
1½" SNAP*ON, 15,000 lin. ft. @ 1.404	21,060
MATERIAL COST SAVINGS WITH SNAP*ON	$10,140

*TEVA (THERMO-ECONOMIC VALUE ANALYSIS) IS AN EXCLUSIVE G-B SERVICE. NO OBLIGATION — JUST CALL YOUR LOCAL G-B DISTRIBUTOR

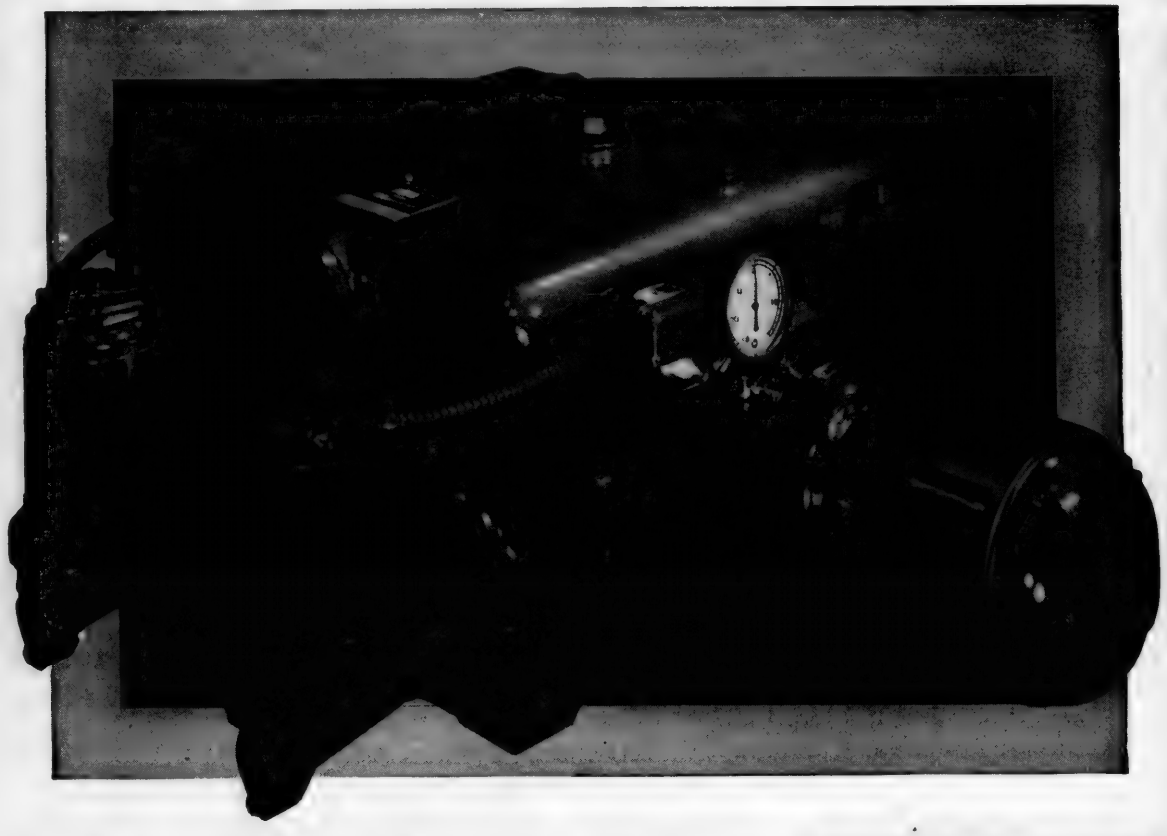
GUSTIN-BACON *Manufacturing Company* GUSTIN gb BACON

Thermal and acoustical glass fiber insulations • Pipe couplings and fittings • Molded glass fiber pipe insulation

222 W. 10TH ST., KANSAS CITY, MO.

THIS NEW VACUUM HEATING PUMP

HAS THE INCREASED AIR CAPACITY EFFICIENT HEATING PRACTICE DEMANDS



It's the Nash CSM

Designed and manufactured by the organization that made the Jennings Manifold Heating Pump standard of the Heating Industry, the new CSM incorporates every desirable feature architects, engineers, owners and operators have sought. Employing separate air and water pump elements, each with its own motor and each independently controlled by its own automatic switch, the capacities and arrangement may be widely varied to meet job conditions. For the first time, the engineer has the choice of realistic water and air capacities required for rapid system response without wasteful overheating.

These pumps possess many other features which permit a more efficient utilization of fuel and minimum use of electric power. Low, low returns reduce installation costs and usually eliminate putting the pump in a pit. Simplicity and efficient operation reduce supervision and maintenance costs. Information regarding this new heating pump development is available immediately upon request.

- Increased air capacity induces rapid system response without wasteful overheating.
- Separate air and water pumps individually selected to meet actual job requirements.
- Control system that operates individual pumps only when needed.
- Flexibility permitting addition of radiation without changing basic pump installation.
- Low, low, return line connection.

NASH ENGINEERING COMPANY
437 WILSON, SO. NORWALK, CONN.

Fig. 1. General view showing the arrangement of UPVC lateral collector ducts and inlet nozzles in relation to tanks.

Industrial Exhaust System

protected by fabricated plastic and plastic coating on metal

E. J. ST. AMAND
Western Electric Company, Winston-Salem, N. C.

Plastic material and sheet metal protected by a plastic coating are used in an exhaust system designed to carry off the highly corrosive fumes from an electroplating plant. This exhaust system and the use of plastics are described. Periodic examinations show plastics used will have a very long life. Units are reported to be in good condition.

PLASTICS, either as a fabricated material or as a coating for sheet metal, form an important part of the industrial exhaust system in the newly constructed plant of Western Electric Company at Winston-Salem, N. C. The exhaust system is designed to carry off all of the combined acid-alkali fumes and steam vapors from the elecroplating and other inorganic finishing tanks. This system can handle up to 180,000 cfm.

Approximately 50% of the entire system installed (all ductwork) is fabricated with unplasticized polyvinyl chloride and the remainder consists of fabricated sheet metal and steel plate sandblasted to white metal and subsequently organic-coated, both spray and dipped, with vinyl base coatings and heat-cured polyvinyl plastisols.

System Operation

Air through the system is moved by one or more of the three 60,000 cfm fans shown in Fig. 2 as F-1, F-2, and F-3. This is a pull-through system, all units being under suction except the stacks and with air entering the system through intake nozzles at the tanks. The air goes into and through the lateral collectors ducts, risers, and overhead ductwork to the pre-scrubber plenum which is located inside the building.

From the pre-scrubber plenum the air passes through six separate ducts, each leading to a fume scrubber located outside the building, and washed air is discharged from the scrubbers to the post-scrubber plenum, and from this plenum to the fans. The fans discharge the air directly upward through the gravity dampers and stacks to the outside atmosphere.

Air Intake Nozzles

All fume-exhausted tanks are exhausted across the back side only through specially designed collection nozzles which are rectangular in cross section, with internal guide vanes directing air flow toward the upstream direction within the lateral collecting ductwork. Five of the air intake nozzles are constructed of No. 16 USG black sheet steel dip-coated and heat-cured with a polyvinyl plastisol after fabrication, and the remainder of the nozzles are fabricated from ⅛-inch thick unplasticized polyvinyl chloride sheet stock for the body and ¼-inch sheet stock for the mounting flanges and face plates. The nozzles are flange-mounted to the lateral exhaust collecting ductwork over the reinforced slot openings.

Ductwork

Designed to operate at 1.5 inches of water static suction pressure, all lateral exhaust collecting ductwork units are rectangular in cross section and are designed to fit either between back-to-back double tank lines or behind single tank lines in specially designed steel pipe fabricated organic-coated supporting cradles. Because of the irregularity of back-to-back tank alignment and

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the limited floor space available for the installation of the lateral collecting ductwork and inlet nozzles, it was necessary to split the entire length of the collector units into two horizontally flanged sections consisting of a lower body section and an upper superstructure section. All body sections are of uniform lengths, while the lengths of superstructure sections are governed by the location of fume inlet nozzle locations. In many instances it was necessary to run diagonal joints at the top of the superstructure in order to avoid intersecting vertical sectional joints with nozzle openings. Also, for reasons of facilitating condensate and cleanout drainage and to effect an economy of construction materials, the lower body base panel was tapered from downstream to upstream.

Overhead ductwork and risers, Fig. 3, are rectangular in cross section and are constructed of unplasticized polyvinyl chloride. Panel sizing and subsequent reinforcing was designed to operate at 2.0 inches of water static suction pressure. These units were limited to 8 ft in length, and the hanger spacing for the overhead runs were limited to 4 ft.

Pre-Scrubber Plenum

A pre-scrubber plenum unit 4.5 ft high, and 74 ft long was installed between all feeders (risers and overhead runs) and six fume scrubber inlet connections. This unit is suspended in trapeze type hangers limited to 4 ft spacings, and is fabricated in 8 sections limited to 10 ft in length. Materials of construction consisted of 14 USG black-sheet steel, all welded, sandblasted, dip-coated and heat-cured with a polyvinyl plastisol material. The minimum coating thickness specified was .045-inch on the interior and .020-inch on the exterior.

Transitions and Spool Pieces

Six compound rectangular transition duct sections and six spool piece duct sections interconnect in pairs between the pre-scrubber plenum and the flexible scrubber connector. These sections are designed to operate at 2.5 inches of water suction pressure and are constructed of unplasticized polyvinyl chloride.

Special Flexible Connectors

The connections between the spool piece duct sections and the fume scrubbers are made with six specially designed (accordion type) flexible connectors. These are designed for 2.5 inches of water static suction pressure and each unit consists of two steel angle face frames with a fiberglas cloth skeleton skirting the two frames, vertically reinforced with rectangular collars of $\frac{1}{4}$-inch diameter steel bars, and finally spray-coated and heat-cured inside and outside with a polyvinyl plastisol to a finish thickness of $\frac{3}{16}$-inch. These units, fitted just outside the building wall, are considered highly corrosion-resistant both internally and externally, and serve to give long-time, trouble-free service in addition to isolating the transmission of vibrations from the fan and scrubber system to the stationary spool piece ductwork.

Fume Scrubbers

Six centrifugal wet-wash type fume scrubbers, with a capacity of 30,000 cfm each, are installed outside the building between the pre-scrubber and post-scrubber plenums and serve to extract soluble fume contaminants from all fumes handled prior to discharging to the outside atmosphere.

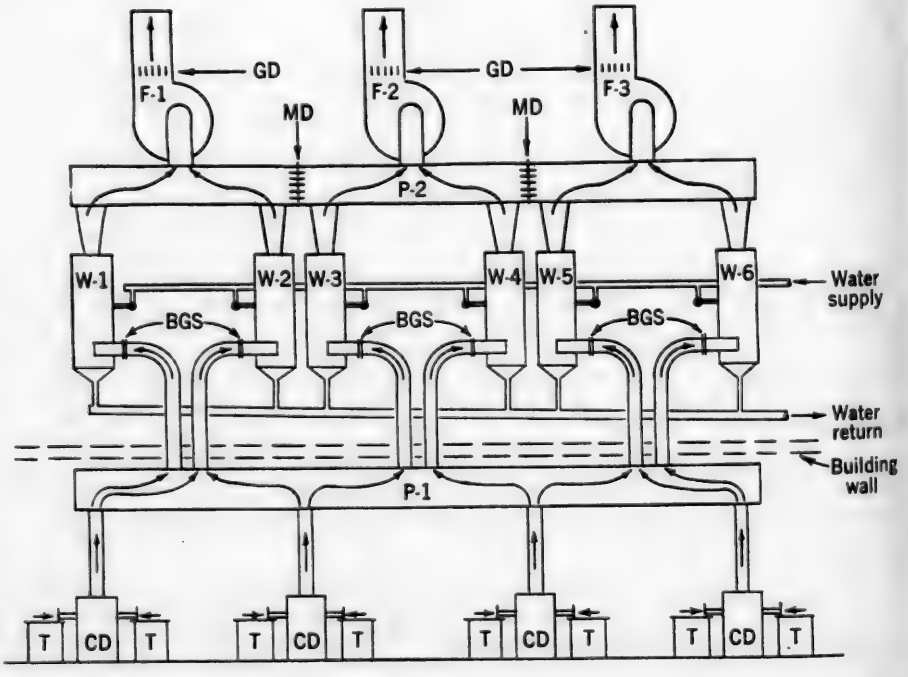


Fig. 2. Diagram showing the layout of the metal finishing fume exhaust system. The following abbreviations are used: T, tanks; CD, collecting ducts; P-1, pre-scrubber plenum; P-2, post-scrubber plenum; W-1, W-2, etc., scrubbers; F-1, F-2, F-3, fans; GD, gravity dampers; MD, manual isolation dampers; BGS, isolation blast gate slot.

These units are 8 ft in diameter and 28 ft high. They are constructed of $\frac{3}{16}$-inch steel plate, sandblasted to white metal and organically coated internally and externally. Through each unit is circulated 50 gpm water at approximately 10 psig. This water of 7.0 to 8.5 pH flows through a continuous, automatic neutralizing system. The internal piping and spray heads (8 each) are unplasticized polyvinyl chloride.

The purposes of these rubber installations are threefold:

1. It diminishes the possibility of contaminated and corrosive fumes entering the main factory building via the main ventilating system (which is located on the factory building roof), should the wind happen to blow the discharged fumes in that direction.
2. The diminished corrosive potential of the fumes handled will have less corrosive effect upon the fume exhaust fans.
3. It diminishes air pollution within the community.

Post Scrubber Plenum

Located tangentially to the scrubbers and exhaust fumes is a post-scrubber plenum, Fig. 4, 3 ft wide, 7 ft high and 77 ft long. This unit serves to collect the fumes discharged from the six scrubbers and feeds the three exhaust fan inlet cones. Installed within this plenum are two quadrant type manual dampers, constructed of type 316 stainless steel. These serve to isolate fan-scrubber sets when it is necessary to make equipment inspections and repairs. This plenum is of welded construction, using No. 11 USG black sheet steel, sandblasted to white metal and organically spray-coated.

Fans

Next in the system are three exhaust fans, rated at 60,000 cfm each at 5-inch static pressure. The fans are of the split-housing type with scroll inspection covers, and are driven by 75 hp part-winding squirrel cage induction motors. The interiors of the fan scrolls and the wheels and the inlet cones were sandblasted to white metal while the exterior surfaces received a commercial blast; all surfaces were sprayed with an organic coating.

Fig. 3. Unplasticized polyvinyl chloride duct system risers leading to inside plenum above lights. At lower center of picture are removable inspection and cleanout covers.

Fig. 4. View from factory building roof showing arrangement of fume exhaust system fans, post-scrubber plenum, and the scrubbers.

Dampers and Stacks

Each fan discharges through a specially designed gravity damper to prevent short-cycling the exhaust system when a fan unit has been stopped. The damper blades and shafting are made of type 316 stainless steel, and the shaft bearings are of Teflon.

The final units of the system consist of three steel stacks with a rectangular base transitioned to 5 ft in diameter and 13 ft long. The finishing of these units is similar to that of the post-scrubber plenum. Each stack is independently supported by a special structural steel frame, and is merely floating above the fan outlet opening.

Summary

All gasketing used were 35-40 durometer plasticized P.V.C., $\frac{3}{16}$-inch thick. All bolts used were type 316 stainless steel, supplemented with Durimet 20 bolts in locations which were difficult to reach for inspection and maintenance. Unplasticized polyvinyl materials used are type I, as typed by the Society of the Plastics Industry, Inc.

All reinforcements and flanging of the unplasticized polyvinyl chloride ductwork was done with extruded unplasticized polyvinyl chloride angle stock. This is the first time in the history of U.P.V.C. that angle stock was successfully extruded and used on a production scale basis in the United States.

All units in the entire system have had their fifth semi-annual examination for corrosion and mechanical failure, and the company is proud to report that the system is in as good a condition today as when first installed in 1955.

CO concentration is critical in

Underground Garage Ventilation

In underground garages serving civic functions carbon monoxide concentration is critical and must be controlled for proper ventilation.

Entrance to 1200-car Auditorium Plaza Parking Garage, Kansas City, Mo.

In underground garages . . . . .

For the $4.1-million Auditorium Plaza Garage which covers an entire city block in downtown Kansas City, Mo., municipal efforts resulted in a beautifully landscaped civic park at street level with three underground parking levels. City officials worked closely in planning the 9-acre, 1200-car facility with Gentry and Voskamp, architects; Howarth, Scott, and Kinney, mechanical and electrical engineers; and Pfuhl and Shideler, structural engineers. Service areas of the building including offices, toilet rooms, and locker rooms are equipped with standard systems of heating, ventilating, and air conditioning. Being underground and because of the storage effect of the great mass of the structure, plus the heat from cars, lights, and humans, the greater part of the building requires no heating and the air temperature remains reasonably constant.

serving civic functions . . . . .

This garage is adjacent to a civic center having an auditorium seating 14,000 and a large theater and exhibition hall. It is also located in the center of a downtown area close to theaters, hotels, and restaurants. All cars are parked by the customers under the supervision and direction of attendants.

carbon monoxide concentration is critical . . . . .

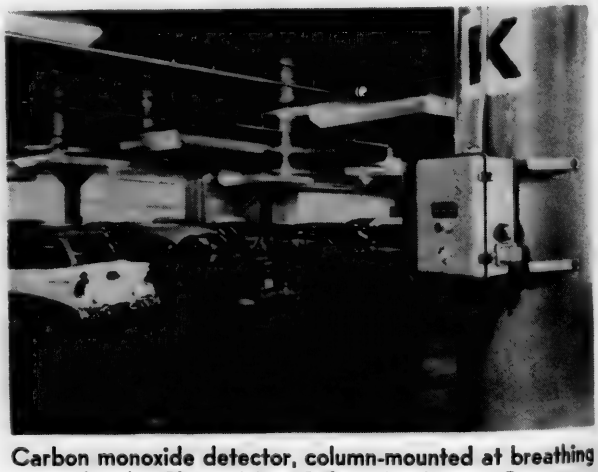
Normal operation is such that time interval reduces the average number of vehicles operating at any time within the building. Space, volume, and natural circulation usually keep the carbon monoxide content to a safe amount. However, traffic becomes extremely heavy in sections of the building when situations occur such as the closing of a capacity attraction at the city auditorium. Vehicle operation during this period may produce a contamination rate greater than the peak in any of the eastern river tunnels. Because of this, the garage is divided into sections (selected by a natural division according to function) and each section is furnished with a 75-hp, 200,000-cfm fan. In addition, a central fan system can deliver 200,000 cfm of outside air throughout the building from a 100-hp fan.

and must be controlled . . . . .

Continuous air samples are taken by nineteen carbon monoxide detectors (one is seen in photo below) mounted at breathing height at strategic points on each level. If the concentration of CO reaches two parts per 10,000 for any section, the local instrument activates a red warning light indicating the particular section on a panel in a central control room. An attendant then starts the central fan system. Under normal operation of the garage, this will bring a fast reduction of carbon monoxide to below alarm settings. The system may be shut down soon after the alarm light goes out if the vehicle traffic has become light. However, if the CO content nears contamination level during a peak period, a fast purge of the affected section is obtained by starting the 75-hp fan for that section.

for proper ventilation.

Regardless, then, of extremes of use causing a great variation in ventilation requirements, continuous air sampling, human supervision, and a versatile fan system keep carbon monoxide concentration at a safe level in each level of the underground garage.



Carbon monoxide detector, column-mounted at breathing height. Photo, Mine Safety Appliances Co.

LOGARITHMIC MEAN TEMPERATURE DIFFERENCES (Cont'd)

Temp. Diff. at One End	Temperature Difference at Other End									
	11	12	13	14	15	16	17	18	19	20
	Logarithmic Mean Temperature Difference									
1	4.17	4.43	4.68	4.93	5.17	5.41	5.65	5.88	6.11	6.34
2	5.28	5.58	5.88	6.17	6.45	6.73	7.01	7.28	7.55	7.82
3	6.16	6.49	6.82	7.14	7.46	7.77	8.07	8.37	8.67	8.96
4	6.92	7.28	7.64	7.98	8.32	8.66	8.99	9.31	9.63	9.94
5	7.61	8.00	8.37	8.74	9.10	9.46	9.81	10.15	10.49	10.82
6	8.25	8.66	9.05	9.44	9.82	10.19	10.56	10.92	11.28	11.63
7	8.86	9.28	9.69	10.10	10.50	10.89	11.27	11.65	12.02	12.38
8	9.42	9.86	10.30	10.72	11.14	11.54	11.94	12.33	12.72	13.10
9	9.98	10.44	10.89	11.33	11.74	12.16	12.58	12.98	13.38	13.78
10	10.49	10.97	11.44	11.89	12.33	12.77	13.19	13.61	14.02	14.43
11	11.00	11.48	11.91	12.43	12.89	13.33	13.79	14.22	14.64	15.06
12	11.48	12.00	12.43	12.95	13.44	13.92	14.35	14.80	15.24	15.65
13	11.96	12.43	13.00	13.48	13.96	14.44	14.90	15.35	15.80	16.26
14	12.43	12.95	13.48	14.00	14.58	14.96	15.47	15.90	16.38	16.81
15	12.89	13.44	13.96	14.58	15.00	15.42	16.02	16.46	16.90	17.40
16	13.33	13.92	14.44	14.96	15.42	16.00	16.63	16.98	17.41	17.93
17	13.79	14.35	14.90	15.47	16.02	16.63	17.00	17.44	17.93	18.50
18	14.22	14.80	15.35	15.90	16.46	16.98	17.44	18.00	18.36	19.00
19	14.64	15.24	15.80	16.38	16.90	17.41	17.93	18.36	19.00	19.36
20	15.06	15.65	16.26	16.81	17.40	17.93	18.50	19.00	19.36	20.00
21	15.47	16.08	16.69	17.26	17.83	18.36	18.95	19.43	20.03	20.50
22	15.87	16.50	17.11	17.71	18.27	18.84	19.40	19.95	20.45	20.99
23	16.27	16.90	17.53	18.13	18.73	19.27	19.85	20.38	20.90	21.46
24	16.66	17.31	17.94	18.56	19.15	19.73	20.29	20.88	21.42	21.94
25	17.05	17.72	18.35	18.97	19.57	20.15	20.73	21.30	21.85	22.41
26	17.44	18.10	18.76	19.39	20.01	20.60	21.20	21.77	22.34	22.87
27	17.82	18.50	19.15	19.80	20.42	21.01	21.62	22.20	22.77	23.33
28	18.20	18.89	19.56	20.20	20.82	21.44	22.05	22.62	23.20	23.78
29	18.57	19.26	19.94	20.60	21.24	21.85	22.47	23.07	23.66	24.22
30	18.94	19.64	20.33	20.99	21.64	22.27	22.88	23.48	24.08	24.66
31	19.31	20.02	20.71	21.39	22.04	22.67	23.29	23.92	24.50	25.10
32	19.67	20.39	21.09	21.77	22.44	23.08	23.72	24.35	24.94	25.53
33	20.03	20.76	21.47	22.16	22.83	23.48	24.13	24.76	25.36	25.96
34	20.38	21.13	21.85	22.54	23.21	23.88	24.53	25.16	25.79	26.38
35	20.73	21.48	22.22	22.92	23.61	24.27	24.92	25.57	26.17	26.80
36	21.08	21.85	22.58	23.30	23.99	24.66	25.32	25.97	26.60	27.22
37	21.43	22.20	22.95	23.66	24.36	25.04	25.72	26.36	27.02	27.63
38	21.78	22.55	23.31	24.04	24.75	25.43	26.11	26.77	27.41	28.04
39	22.12	22.91	23.67	24.40	25.12	25.81	26.50	27.16	27.81	28.45
40	22.47	23.26	24.02	24.77	25.49	26.19	26.88	27.56	28.21	28.85

LOGARITHMIC MEAN TEMPERATURE DIFFERENCES (Cont'd)

Temp. Diff. at One End	Temperature Difference at Other End									
	21	22	23	24	25	26	27	28	29	30
	Logarithmic Mean Temperature Difference									
21	21.00	21.50	21.98	22.47	22.94	23.41	23.87	24.33	24.79	25.23
22	21.50	22.00	22.50	22.99	23.47	23.94	24.41	24.88	25.34	25.77
23	21.98	22.50	23.00	23.50	23.99	24.47	24.95	25.42	25.91	26.35
24	22.47	22.99	23.50	24.00	24.50	25.00	25.47	25.95	26.42	26.89
25	22.94	23.47	23.99	24.50	25.00	25.50	25.99	26.47	26.95	27.43
26	23.41	23.94	24.47	25.00	25.50	26.00	26.50	26.99	27.47	27.95
27	23.87	24.41	24.95	25.47	25.99	26.50	27.00	27.50	27.99	28.47
28	24.33	24.88	25.42	25.95	26.47	26.99	27.50	28.00	28.50	28.99
29	24.79	25.34	25.91	26.42	26.95	27.47	27.99	28.50	29.00	29.50
30	25.23	25.77	26.35	26.89	27.43	27.95	28.47	28.99	29.50	30.00
31	25.68	26.24	26.80	27.35	27.89	28.43	28.95	29.47	29.99	30.50
32	26.12	26.69	27.25	27.81	28.36	28.90	29.43	29.96	30.48	30.99
33	26.55	27.13	27.70	28.26	28.82	29.36	29.90	30.43	30.96	31.48
34	26.98	27.57	28.14	28.71	29.27	29.82	30.37	30.90	31.43	31.96
35	27.41	28.00	28.58	29.16	29.72	30.28	30.83	31.37	31.91	32.44
36	27.83	28.43	29.02	29.60	30.17	30.73	31.28	31.83	32.37	32.91
37	28.25	28.85	29.45	30.03	30.61	31.18	31.74	32.29	32.84	33.38
38	28.66	29.27	29.88	30.47	31.05	31.62	32.19	32.75	33.30	33.84
39	29.08	29.69	30.30	30.90	31.48	32.06	32.63	33.20	33.75	34.30
40	29.49	30.11	30.72	31.32	31.91	32.50	33.08	33.64	34.21	34.76

Temp. Diff. at One End	Temperature Difference at Other End									
	31	32	33	34	35	36	37	38	39	40
	Logarithmic Mean Temperature Difference									
31	31.00	31.50	31.99	32.48	32.96	33.44	33.91	34.38	34.85	35.31
32	31.50	32.00	32.50	32.99	33.48	33.96	34.44	34.91	35.38	35.85
33	31.99	32.50	33.00	33.50	33.99	34.48	34.96	35.44	35.92	36.39
34	32.48	32.99	33.50	34.00	34.50	34.99	35.48	35.96	36.44	36.92
35	32.96	33.48	33.99	34.50	35.00	35.50	35.99	36.48	36.96	37.44
36	33.44	33.96	34.48	34.99	35.50	36.00	36.50	36.99	37.48	37.96
37	33.91	34.44	34.96	35.48	35.99	36.50	37.00	37.50	37.99	38.48
38	34.38	34.91	35.44	35.96	36.48	36.99	37.50	38.00	38.50	38.99
39	34.85	35.38	35.92	36.44	36.96	37.48	37.99	38.50	39.00	39.50
40	35.31	35.85	36.39	36.92	37.44	37.96	38.48	38.99	39.50	40.00

Note: Repetitive tabular values have been eliminated from this page of the table. Thus, values from 1-20 in the column on the extreme left are omitted because the corresponding tabular values are identical to those corresponding to 21-30 of the extreme left columns in the first pages of this table, one of which appears on the preceding page, the other in last month's issue.

Linear interpolation of these data will yield results within the accuracy of the table.

AIR CONDITIONING, HEATING and VENTILATING'S

REFERENCE SECTION

MARCH, 1958

Roof and Zone Tanks for Multi-story Buildings

GEORGE R. JERUS
Sanitary Engineer, Meyer, Strong & Jones, Consulting Engineers,
New York, N. Y.

Design, construction and specification details for wood and metal tanks for multi-story buildings

Roof and Zone Tanks for Multi-story Buildings

GEORGE R. JERUS
Sanitary Engineer, Meyer, Strong & Jones, Consulting Engineers, New York, N. Y.

In the design of multi-story buildings, two important provisions must be included: (1) tanks for the domestic storage of water and (2) a reserve of water to be used for fire fighting. Where building height would result in excessive static pressures in the pipe lines from the roof tank, zone tanks must be installed to serve a specific zone or group of floors. The design of roof tank and zone tank systems is covered, in addition to details regarding the construction of wood and metal tanks.

ROOF tanks, either of wood or steel construction, are installed on the roofs of multi-story buildings, either in the open, in a penthouse, or they are covered by some kind of architectural treatment. They are an important part of the water system for the building and they are depended upon to supply fire stations on the various floors of the building, in the event of fire.

Basically, tanks in a multi-story building may be installed for domestic storage, pressure break, fire reserve, or for use as a suction tank. Each of these functions will now be considered.

Domestic Storage. When the height of a building exceeds the pressure on the city main, a tank for domestic storage would be required. These would also be necessary if the peak draw would reduce the pressure at the topmost floor to less than 10 psi which is about the minimum pressure required to give satisfactory operation of fixtures, particularly those with flush valves. To provide sufficient pressure at the top floor fixtures, it is necessary to elevate the bottom of the tank approximately 31 feet above the highest usable floor. This will insure a minimum static pressure of 13.5 psi. Where water would be required above the highest usable floor, such as penthouse air washers for air conditioning or window washing units, a separate pressure tank system may be required to provide sufficient water.

Pressure Break. In the event a tank is required for domestic storage, the next question that arises is "How high is the building?" This is important because a house tank placed in the penthouse of a 40-story building would be about 550 ft above street level (assuming 13 feet per story and 31 feet to the tank bottom) which means a static pressure of 238 psi. This pressure is far too great for operation and would cause excessive maintenance on valves, washers and moving parts. Because of this, it is necessary to install an additional tank or tanks within the building which would divide the building into a greater number of zones.

Fire Reserve. Again the factor that determines whether or not a tank is used is the pressure and the quantity of water available in the city mains. It is generally recommended that a minimum of 15 psi pressure be obtained at the highest hose outlet. If this pressure were not available, it would be necessary to install either a fire tank with sufficient water storage, a pressure tank or a fire pump. This article will deal only with the gravity tank for fire reserve, the capacity of which is determined by local laws and ordinances. The fire reserve may be combined with the domestic water in a combination house and fire tank, provided the connections at the tank are arranged in a manner that the domestic supply is located above the fire reserve and the fire reserve can never be drawn from the tank except in the event of fire. The bottom of the tank must be 25 ft above the highest outlet on a usable floor.

Suction Tank. The suction tank provides a constant volume of water from which the house pumps can draw. It also provides a pressure break from the city mains and, therefore, enables the pumps to be selected for maximum efficiency at a constant suction head.

Many engineers argue that it is better to use the head available from the city mains and boost the water from the potential level of the city water pressure up to the house tank. More often than not this is the case, but in certain localities with small mains in the city grid system, a relatively constant pressure cannot be maintained in the city mains. When this pressure has wide variances, it may be impossible to select a house pump with a non-overload characteristic, unless the motor size exceeds a logical and economical horsepower. In such a case it may be necessary to install a suction tank or provide a pressure reducing valve on the pump suction; this is not generally accepted as good practice, although it may be employed as a last resort.

Other instances where a suction tank should be employed is where the quantity of water for periodic demands is far in excess of the available supply in the mains. Then, it would be possible to "pull down" the main causing the pump motor to overload for there is no water to pump. The suction tank permits the peak

draw on the city mains to be spread over a greater period of time and, therefore, a sufficient supply is available for the area. Many codes establish when a suction tank is required. Often the code establishes the maximum size of pump suction that may be connected to a street service. Personally, this is a complete fallacy as the rate of flow through the same size suctions on different pumps vary tremendously. Codes also permit dividing loads between a greater number of pumps and the use of more pumps to do the job even though the pumps will be required to run simultaneously, and will draw much more water than one pump with a larger suction. If the city wants to limit flow without the use of suction tanks, this quantity of flow should be adequately established and a rule of thumb eliminated. However, even with the use of an established quantity of flow, the allowable draw in different areas of the same city would vary due to the design of the grid system and the permissible pressure drop in the area in question.

Types and Construction Details of Tanks

This article will not cover the design and construction of pressure tanks as there are not many systems of this type. Generally, the cost, space requirements and maintenance make this type of system undesirable for large installations.

Wooden Tanks. This type of tank, Fig. 1, is more or less the old standby for gravity house tanks. The tank is circular in section with sides tapered or vertical, with the taper not exceeding one inch per foot. The lumber must be well seasoned and free from rot, unsound knots and worm holes. Acceptable untreated species of red cypress, redwood, western red cedar, southern white cedar and Douglas fir are generally the woods used listed in order of preference. Structural timbers must be treated with creosote. The staves, or vertical sections of tank, shall not be less than 2½-inch nominal thickness for tanks up to 16 ft dia and at least 3 inches for tanks greater than 16 ft dia. The staves shall be held in place by hoops not less than ¾ inch in diameter.

The hoops are usually made in three sections, having a length approximately three feet greater than the tank circumference and held in place by hoop lugs with nuts. The spacing of the hoops is based upon the following formula:

$$\text{Spacing (inches)} = \frac{12{,}500 \times \text{area of hoop (square inches)}}{2.6 \times \text{tank diameter (ft)} \times \text{depth (ft)}}$$

used by the National Board of Fire Underwriters in their regulations.

The wooden tank is elevated the required distance by means of a structural steel or reinforced concrete structure. On top of this structure, is placed steel dunnage beams (I-beams). The tank shall have a flat wooden cover over which shall be a conical shape roof. Both roof and cover shall be provided with an access opening. A ladder should be provided both inside and outside the tank to obtain passage through the access opening or roof hatch. All steel work except that which is encased in concrete shall be painted with red lead after the steel has been thoroughly cleaned of mill scale rust and grease.

Wooden tanks are generally the least costly, but they require more checking and more ventilation than tanks of other types of construction. The ventilation is for the purpose of preventing dry rot. One of the main disadvantages is the fact that the shape is predetermined. Because of this, a tank located in a lower section of the building (when building is zoned) would require a rectangular space generally two stories high, hence a loss of area and rentable space. Table I gives sizes, weights and capacities of wooden tanks. Read to the left of the heavy vertical dividing line for inside diameters to the left of this line, and to the right of this line for other sizes.

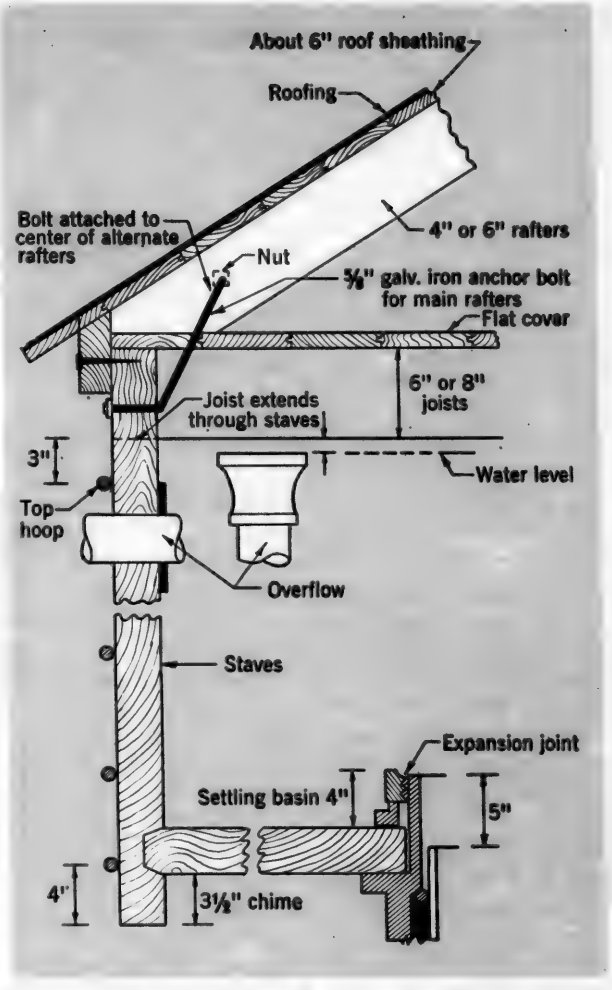


Fig. 1. Section through a wood tank.

A typical specification for a combined house and fire tank of wood construction follows:

Combined House and Fire Tank (Wood)

1. Furnish, and erect where indicated on drawing, on a structure furnished by others, one round tank ——— inside diameter by ——— stave length having a capacity of ——— gallons.

2. Tank shall be constructed of all heart, or tank grade, California Redwood free from loose or unsound knots, thoroughly air dried, without any sapwood after shaping and shall bear the grade mark, and trademark, of the Association under which rules it is manufactured, or otherwise acceptable, identified, or certified. The bottom and staves shall be 3 inches thick, dressed to

TABLE I—WEIGHT AND CAPACITY OF WOOD TANKS

Weight per Ft Depth, Tons		1.68	2.12	2.61	3.16	3.75	4.39	5.07	5.81	6.60	7.43	8.32	9.25	10.23	Weight per Ft Depth, Tons	
Gal per Ft Depth		376.01	475.89	387.52	710.9	846.03	992.91	1151.5	1321.9	1504.1	1697.9	1903.6	2120.9	2350.1	Gal per Ft Depth	
		Inside Diameter, Feet														
Cap. Gal	Weight, Tons	8	9	10	11	12	13	14	15	16	17	18	19	20	Weight, Tons	Cap. Gal.
		Depth of Tank, Feet														
2,444	11.2	8							14						73.2	16,524
3,093	14.0		8								12				78.7	17,828
3,196	14.5	10					20								81.6	18,369
3,819	17.3			8				16							74.0	16,697
3,948	17.8	12								14					83.0	18,801
4,045	18.3		10						16						85.0	19,168
4,700	21.2	14										12			88.0	19,988
4,994	22.5			10						15'-3½" dia. x 16'-0" H					88.0	20,000
4,997	22.5		12					18							84.1	19,000
5,452	24.5	16									14				93.5	21,224
5,949	26.8		14							16					96.2	21,809
6,043	27.2				10				18						96.4	21,811
6,169	27.8			12									12		98.0	22,269
6,900	31.0		16					20							94.3	21,303
7,191	32.2					10						14			104.6	23,795
7,344	33.0			14					20						108.0	24,455
7,464	33.5				12						16				108.4	24,620
8,440	37.7						10			18					109.4	24,818
8,519	38.2			16						17'-0½" dia. x 16'-0" H					110.3	25,000
8,883	39.7					12							14		116.3	26,511
8,886	39.8				14							16			121.2	27,602
9,788	43.6							10		20					122.6	27,826
10,308	46.1				16						18				123.2	28,015
10,426	46.5						12							14	128.5	29,376
10,575	47.2					14				17'-6½" dia. x 18'-0" H					130.2	30,000
11,236	50.0								10				16		134.8	30,753
11,730	52.4				18							18			137.9	31,409
12,091	54.0							12			20				138.1	31,411
12,267	55.0					16								16	149.0	34,076
12,441	55.2						14						18		154.3	34,995
12,785	56.7									10		20			155.3	35,217
13,152	58.7				20									18	169.6	38,777
13,880	61.5								12				20		171.8	39,237
13,960	63.0					18					19'-1½" dia. x 20'-0" H				175.2	40,000
14,394	64.0							14						20	189.9	43,477
14,397	64.0						16							22	210.5	48,177
15,000	66.5	14'-2½" dia. x 14'-0" H									21'- 6½" dia. x 20'-0" H				220.6	50,000
15,652	70.0					20					23'- 6½" dia. x 20'-0" H				260.4	60,000
15,793	69.8									12	23'-10½" dia. x 24'-0" H				325.0	75,000
16,383	73.0						18				28'- 6" dia. x 24'-0" H				450.0	100,000

2¾ inches. The width of planking on the bottom shall be suitable for the piping connections therein.

3. All staves shall be milled to a true circle on the outer side, and a true radial line on the edges, and shall be provided with a properly designed, and accurately cut croze, to provide a proper drive fit with the bottom planks.

4. Bottom planks shall be milled and surfaced on all four sides, cut to a true circle and accurately chamfered at the edge so as to make a proper fit with the croze in the staves. All bottom pieces shall be furnished in one piece without a splice and shall be doweled, with dowel holes bored in the center of each plank. The edges of each bottom plank and stave shall be bored with holes not over 5 ft apart for wooden dowels not less than ⅝ inch in diameter. The four bottom planks in the center shall not be less than 12 inches in width so as to receive the pipe connections within each wide plank. The finished tank lumber shall not be exposed to the weather before erection.

5. The tank shall be equipped with ——— round steel galvanized hoops ——— inches in diameter, having a tensile strength of not less than 60,000 psi with an elastic limit of at least one-half of its ultimate strength. Two hoops shall be placed opposite the tank bottom and all hoops shall be made in three pieces with lugs of the straight pull canopy type and of the best quality of galvanized malleable iron having a tensile strength in excess of the hoops with which they are used in conjunction.

6. Tank shall be provided with a flat wooden cover of 3-inch tongued and grooved Swamp Cypress, or California Redwood, tank grade, resting on 3-inch x 8-inch parallel joists spaced not over 36 inches on centers. The full section of all joists at their ends shall be solidly supported by resting in slots cut entirely through the staves. This cover shall be cut to a true circle at the top of the tank. This cover shall have a hatch not less than 20 x 22 inches at the side of the tank with sliding cover to the inside of the tank.

7. Furnish and install a cone cover for the tank, supported on 2-inch x 6-inch rafters, spaced 36 inches apart at outside perimeter with 2-inch x 3-inch griding between the rafters not less than 36 inches apart. Furnish and install ⅞-inch sheathing of North Carolina pine over the entire roof, planing same so that no sharp edges or hamps remain. Provide a tight fitting collar to fit around the top of the tank to make a tight joint under the eaves of the cone roof. The upper surface of the cone roof shall be covered with 83 lb rubberoid roofing with 3-inch cemented laps and held in place with large head galvanized nails. Provide a 22-inch x 24-inch door in the cone roof directly over the hatch of the flat tank cover, held in place with 6-inch x 6-inch extra heavy galvanized steel hinges, and substantial hook and eye device for holding cover open, and fastening securely when in a closed position.

8. A wood ladder shall be provided on the inside of the tank made of the same material as furnished for the tank extending from the hatch to the bottom of the tank properly fastened at the upper and lower ends. This ladder shall have 2-inch x 4-inch side pieces spaced at least 14 inches apart and 1-inch x 2-inch rungs spaced 12 inches apart on centers, securely spiked into slots so as to be flush with the sides.

TABLE 2—CAPACITY OF STEEL TANKS

Tank Area, Sq Ft	Height of Tank, Feet, Allowing 1 Ft for Floats and Overflow						
	4.0	4.5	5.0	5.5	6.0	7.0	8.0
	Capacity of Tanks, Gallons						
60	1350	1580	1800	2030	2250	2700	3150
80	1800	2100	2400	2700	3000	3600	4200
100	2250	2620	3000	3370	3750	4500	5250
120	2700	3150	3600	4050	4500	5400	6300
140	3150	3670	4200	4730	5250	6300	7350
160	3600	4190	4800	5400	6000	7200	8400
180	4050	4720	5400	6080	6750	8100	9450
200	4500	5230	6000	6730	7500	9000	10500
220	4950	5750	6600	7400	8250	9900	11600
240	5400	6300	7200	8100	9000	10800	12600
260	5850	6810	7800	8800	9750	11700	13600
280	6300	7350	8400	9450	10500	12600	14700
300	6750	7890	9000	10500	11250	13500	15800

9. Provide a galvanized steel ladder on the outside of the tank extending from the building roof to the top of the tank. The ladder shall be constructed of 2½-inch x ⅝ inch flat iron side bars spaced 14 inches apart and shall have ⅝ inch rungs space on 12-inch centers. The ladder shall be securely fastened to the roof slab, and the tank. Provide a gooseneck over the top of the tank and at the platform. Refer to detail for position and design of ladder.

10. Furnish and install ——— galvanized steel I-beams weighing not less than ——— pounds per foot. The supports for the I-beams will be provided under another Division. Make provision to cut all the necessary holes required for the pipes going through the bottom of the tank and see that these holes are cut accurately before erection of the tanks.

11. Provide a ½ inch hole in each dunnage beam in location as directed for connection of a lightning ground.

12. All water and overflow connections are to be taken through the bottom of the tank. House supply shall be extended up inside tank with a standpipe to maintain the proper fire reserves as required by the Building Code or Fire Department. The overflow shall be extended with a standpipe in a similar manner.

13. Extra heavy companion flanges securely bolted and made water tight are to be used for each connection. The outside flanges are to be of material similar to the individual pipe connected. All inside flanges are to be brass. All piping inside the tank to be of brass, or Type "TP" copper tubing.

14. Provide and install an approved cast brass strainer inside the tank, for the fire standpipe connection, and for the domestic supply.

Steel Tanks

A steel tank has become more common in today's modern buildings as the shape of this tank can be moulded to fit any space condition that arises; within certain limits. Details are shown in Fig. 2. The tank cannot be too shallow nor have a large surface area because the surges of the filling water would cause erratic readings, false high and low water alarms, along

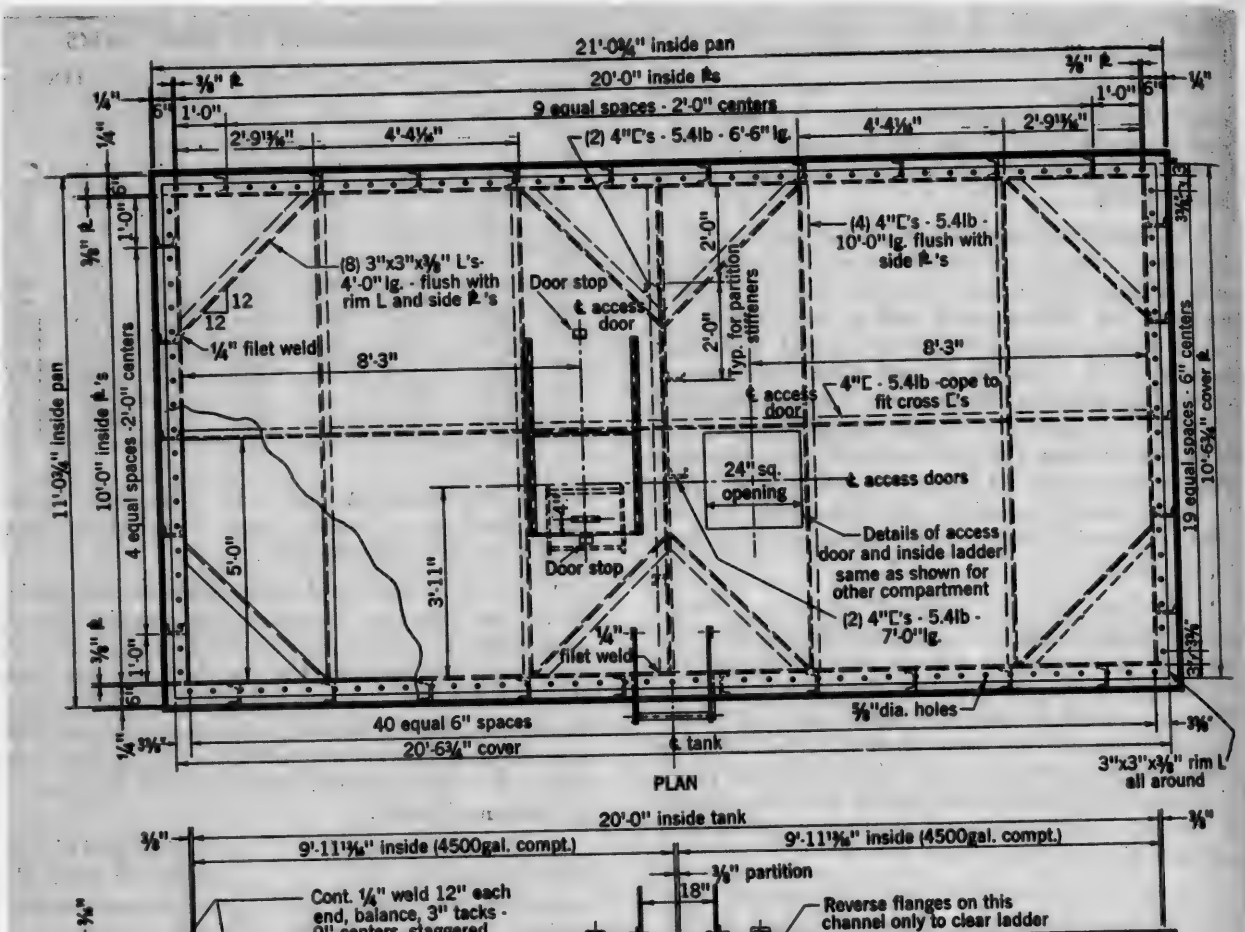

21'-0¾" inside pan
20'-0" inside tks
9 equal spaces - 2'-0" centers
(2) 4"C's - 5.4lb - 6'-6" lg.
(8) 3"x3"x⅜" L's - 4'-0" lg. - flush with rim L and side ℄'s
Door stop & access door
(4) 4"C's - 5.4lb - 10'-0" lg. flush with side ℄'s
Typ. for partition stiffeners
4"C - 5.4lb -cope to fit cross C's
24" sq. opening
& access doors
Details of access door and inside ladder same as shown for other compartment
(2) 4"C's - 5.4lb - 7'-0" lg.
¼" filet weld
⅝"dia. holes
40 equal 6" spaces
20'-6¾" cover
& tank
PLAN
3"x3"x⅜" rim L all around
20'-0" inside tank
9'-11⅜" inside (4500gal. compt.)
⅜" partition
Cont. ¼" weld 12" each end, balance, 3" tacks - 9" centers, staggered
Reverse flanges on this channel only to clear ladder
30, 6" channels - 8.2lb - 6'8" lg.
Cont. weld ¼" on each side for 12" at ends only
4"x¼" bar
7 equal 2'-9" spaces
21'-2" bottom ℄ pan
Note: Do not weld top flanges of beams to underside of tank bottom
ELEVATION
Cont. ¼" weld 12" each end, balance, 3" tacks - 9" centers, staggered (bottom only)

Fig. 2. Plan and elevation of a rectangular two-compartment house tank of steel construction.

with the stopping and starting of pumps on the least provocation. A method of preventing this is discussed later under floats and alarms. Steel for this tank shall be only open hearth steel with design stresses not in excess of the following: tension—15,000 psi; shearing-rivets—11,250 psi; bearing-rivets 22,500 psi; and bending—16,000 psi in the extreme fiber. In lieu of rivet construction, the trend is toward a fully welded tank with welds designed in accordance with the procedure adopted by the American Welding Society, Fig. 3. All welders employed for this work shall be qualified in accordance with the society's requirements. The steel thicknesses, in addition to providing no stresses in excess of the ones given, shall be increased $\frac{1}{16}$ inch over

the calculated section, thus providing a corrosion factor for the tank.

Tanks shall be provided with an access aisle around the entire tank to facilitate painting and maintenance. The bottom of the tank shall be accessible for painting and maintenance; this is accomplished by placing the tank bottom on dunnage beams, generally 18-inch I-beams. The top of the tank shall be provided with stiffening angles to which is bolted a steel cover with access openings. In this tank, as in the case of the wooden tanks, an access ladder both inside and outside of the tank shall be provided.

The tank shall be protected from corrosion by both shop and field painting. Because it is necessary to chip and repaint this tank, it is advisable to construct the tank with a watertight dividing partition with connections from each of the separate compartments. This permits the draining down one compartment for cleaning without taking the entire tank out of service, a definite advantage of this type of tank over the wooden tank. In the case of a tank used solely for fire reserve, it is not advantageous to use a dividing partition as the maintenance on such a tank is practically nil, since there is very little water movement, hence reduced corrosion. Capacities of rectangular steel tanks are listed in Table 2.

A typical specification for a steel suction or combination house and fire tank would be as follows:

House and Suction Tanks

Furnish, erect, and connect up the following tanks:

1. The combination house and fire tank shall be ——— long by ——— high, containing ——— gallons and having a fire reserve of ——— gallons. Tank to have a partition dividing the tank in two equal compartments. Tank shall be provided with a pan and a cover.

2. Suction tank shall be ——— long by ——— wide by ——— high containing ——— gallons with a partition dividing tank in two equal compartments and provided with pan and cover.

3. All the tanks shall be constructed as follows: Sides, bottom and partition to be made of $\frac{3}{8}$ inch steel plate. Sides shall be flanged out 3 inches all around top for stiffness and drilled for bolting cover with $\frac{1}{2}$ inch bolts on 6-inch centers. In lieu of the 3-inch flange, the contractor may substitute a continuous 3-inch x 3-inch x $\frac{3}{8}$ inch angle around the four sides at the top of the tank; heel of angle shall be continuously welded to the tank partition; top of angle shall have welds at least 3-inch long, 12-inch on center. All corners to be butted and welded inside and outside. Sides and bottom plates to extend approximately $\frac{1}{2}$ inch beyond end plates to allow for full fillet weld, and the seams to be welded full on the inside. Tank to be braced on the inside at top

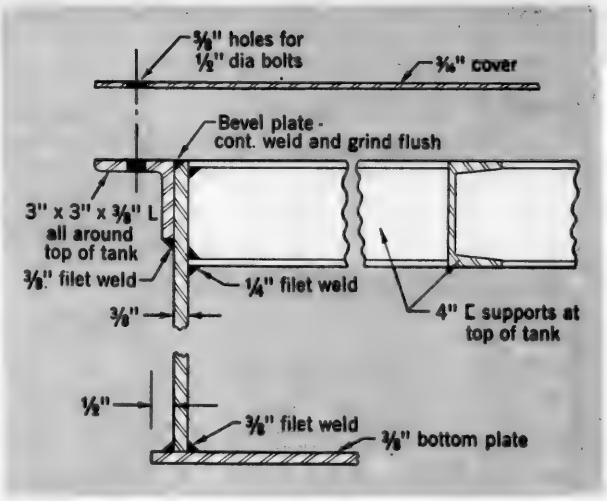

⅜" holes for ½" dia bolts
⅜6" cover
Bevel plate - cont. weld and grind flush
3" x 3" x ⅜" L all around top of tank
⅜" filet weld
¼" filet weld
⅜"
4" C supports at top of tank
½"
⅜" filet weld
⅜" bottom plate

Fig. 3. Typical tank section, outside partition, steel tank.

with 4-inch 5.4 pound channels in each compartment welded solid to sides of tank and flush with top; also with four diagonal corner braces in each compartment of 3-inch x 3-inch x $\frac{3}{8}$ inch angles at least 3 ft long set on a 45 deg angle and welded to end and side of tank and partition flush with top at heel of 4-inch channel. Dividing partition shall be braced vertically with 6-inch, 8.2 pound channels on approximately 29-inch centers. Tank shall be braced vertically on the outside, with 6-inch, 8.2 pound channels spaced on approximately 29-inch centers. Channels shall be welded solid at top and bottom at both the heel and toe of the channel for a distance of 12 inches and properly tack welded on 12-inch centers on both the heel and toe of the channel. Tank shall be furnished with outlets of heavy forge steel welding flanges as shown on plans.

4. Cover shall be made of $\frac{3}{16}$ inch plate and bolted to top of tank with $\frac{1}{2}$ inch bolts on 6-inch centers. Provide, in cover, one 24-inch x 24-inch sliding access door in each compartment.

5. Provide one 18-inch galvanized ladder inside each compartment, and one galvanized ladder on the outside with goose neck. Ladders shall be made of 2-inch x $\frac{1}{2}$ inch strings with $\frac{3}{4}$ inch rungs on 12-inch centers.

6. Each pan shall be made of $\frac{1}{4}$ inch plate and shall be 6 inches larger all around than the corresponding tank. Sides are to be at least 4 inches high with all seams welded on the inside and outside. Provide a 2-inch drain flange in corner of pan.

7. All welds shall be ground smooth and no weld in tank bottom or pan shall occur over or under the dunnage beams.

8. Provide, under all tanks, dunnage beams of such length so that the tanks do not have more than a 6 inches overhang on the ends of the beams. Beams shall be 18-inch I-beams weighing not less than 49 lb per foot. Beams shall not be spread over 2 ft-9 inches on centers.

9. Tank, pan and beams shall be cleaned and brushed to remove dirt and oxide scale, and then given one coat of bituminous solution applied cold in shop on

ABBREVIATIONS USED IN DRAWINGS

C.W—Cold Water
H.W—Hot Water
CLG—Ceiling
P.H. —Pent house
FSP —Fire standpipe
HDR —Header
CIRC—Circulator
P.R.V.—Pressure reducing valve
HTRS—Heaters

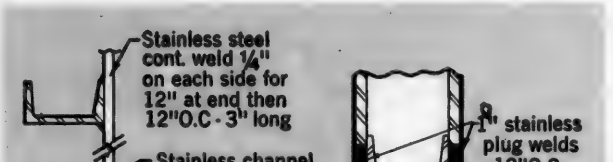

Stainless steel cont. weld ¼" on each side for 12" at end then 12"O.C - 3" long
Stainless channel and partition
PLAN
Dividing partition stainless steel
Stainless channel staggered on alternate sides of partition
SECTION
Carbon steel channel
PLAN
1" stainless plug welds 12"O.C
Stainless steel clad plate
Stainless clad plate
Plug weld
Interior painted
SECTION

Fig. 4. Dividing partitions for stainless clad tanks.

the inside and outside before shipping. Paint in field with one coat of bituminous solution applied cold and one coat of bituminous enamel applied hot on the inside of tank, including underside of cover. On the outside, paint one coat of bituminous solution applied cold, including beams and pan.

Note: with any steel tank the outside tank supports shall be spaced at 2 ft for tanks 8 to 10 ft in height and changed to 8-inch 11.5 lb channels over 10 ft in height with spacing at 29 inches.

Stainless Steel Clad

The stainless steel clad type of tank runs the initial cost of installation up, but because it does not require as much internal maintenance as the steel tank, it may prove more economical over a longer period of time. The tank construction of the steel clad tank would be similar to that of the carbon steel tank with the exception of the welding procedure and the construction of the dividing partition.

All surfaces of the tank coming in contact with the water shall be clad with a 20% stainless steel, type 304. The thickness of the plates for sides and bottom shall be as for carbon steel. The dividing partition may be constructed with either a full stainless steel plate braced with stainless steel channels, two stainless clad plates back to back braced with stainless steel channels, or two stainless clad plates with carbon steel channels between held in place by stainless plug welds. (Fig. 4). Extreme care should be taken in welding of the clad material as too much heat or improper procedure will change the molecular structure of the stainless steel which may render it an ineffective corrosion resistor. See Fig. 5.

In Fig. 5, the four steps in making the weld are

1. Set beveled plates.
2. Weld carbon steel. First steel weld must not penetrate into cladding.
3. Chip back clad side.
4. Weld clad side with clad material.

The carbon steel welds should be made first, and then the stainless welding. In the case of butt joints, it is often recommended that the first pass of the carbon steel weld and surface of clad steel be chipped back before welding with the stainless steel. Welds in the bottom of the tank, if absolutely necessary, shall be full stainless steel and be made over a backing strip running the entire length of the weld.

One method of testing the corrosive resistance of the tank would be to wet the welds several times allowing time for drying between each wetting. If the crystalline structure has been affected, the welds will show rusting and would therefore, have to be chipped out and re-welded. In a tank of this type, it is imperative that no rust spots appear because all the corrosion will then be concentrated on this spot and corrosion would therefore be accelerated causing pinholes in the tank.

As the general belief is that corrosion is an ion exchange, there has been progress made in the use of a cathodic charge for deploying corrosion. However, in steel tanks, this method results in a sludge deposit. The use of an anode rod in a hot water heater is a treatment along these lines.

Connections to the tanks would be made through stainless steel nipples or couplings welded to the tank or by the use of stainless steel companion flanges.

A typical specification for this type of tank is not required as the one for the steel tank will hold except for the incorporation and modifications in accordance with the above description and Figs. 4 and 5. The exterior of the tank and the underside of the carbon steel cover and carbon steel supporting channels below cover shall be painted with a bitumastic coating similar to that previously described.

Copper Lined Tank

For the sake of completeness, this type of lining is mentioned. Although it is acceptable in hot water heaters, it is not recommended for gravity tanks as the cost of such an installation is exorbitant. The lining must be installed in the field which is one disadvantage but the main disadvantage is that it must be installed by another trade and therefore, a jurisdictional dispute arises. Further, with a metal as soft as copper, it is impossible to scrape the sludge from the bottom of the tank without scraping away some of the copper or damaging a soldered seam.

Piping for Two Tanks

In certain instances, architectural considerations will

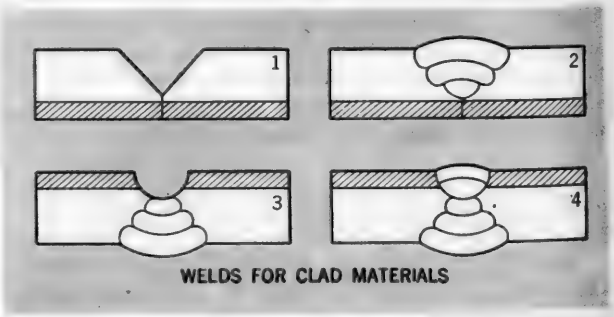


Fig. 5. Welds for clad materials.

not permit the installation of one large tank, but would require two separate tanks on the same floor. Under these conditions, it is advisable to interconnect the two tanks in such a manner as to simulate a two compartment tank; in other words pipe balancing lines between the two tanks.

Overflows and Drawoffs

Any and all of the tanks mentioned must, of necessity, be provided with an overflow connection at the top of the tank and a drawoff in the bottom of the tank. In the case of a two-compartment tank, each compartment must be provided with an overflow and drawoff.

The overflow shall be one commercial pipe size larger than the fill pipe to said tank and should not be less than 3 inches. The inside top of the overflow pipe shall not be less than one-inch below the spider rod holes in a steel tank and not less than one inch below the flat cover joists of a wooden tank. In no case shall it be less than 3 inches below the top of the tank. Any portion of the overflow pipe running within the tank shall be brass or bronze (ips) pipe without couplings.

The drawoff or emergency drain for the tank shall be a minimum of 2 inches for tanks with up to a 5000 gal capacity; 3 inches for tanks with more than 5000 gal capacity but not more than 10,000 gal; 4 inches for tanks of greater capacity. The drawoff shall be provided with an outside screw and yoke type valve located so that it is readily accessible for immediate manual operation. This connection can be taken from the tank bottom separately or from the fire connection from the bottom of the tank. The pan beneath the tank shall be provided with a 2-inch drain connection to carry away any water that may accumulate in the pan. The only water in the pan would be from condensation or a leak in the tank. The overflow, drawoff and pipe from the pan drain may be combined and piped to discharge in such a manner so as to avoid any water damage. These pipes usually are piped to spill onto a roof but in extreme cases, this is impossible and other type of connections are necessary. See Fig. 6. Some communities permit connection into a leader line provided that the pipe is carried down a couple of stories and then provided with a valve and a check valve; other communities shun this and insist that a positive air gap be provided between the potable water supply and any drain line regardless of the vertical height of the leader. When connecting the pan drain to the overflow and drawoff line, it is necessary that the line from the pan drain be provided with a check valve due to the fact that there is a remote possibility that the overflow line will be running full. If this occurs, water could conceivably back up the pan drain line and overflow the pan unless the check valve is installed and working.

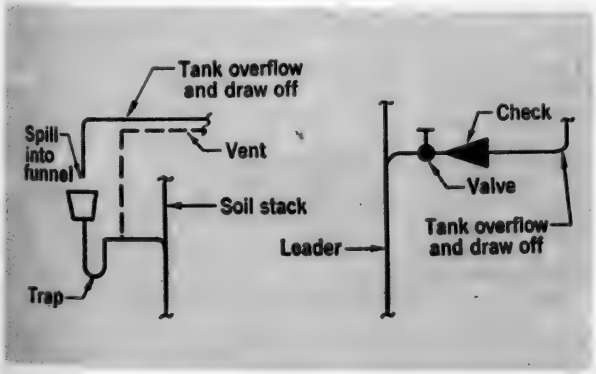


Fig. 6. Diagrams showing connections for tank overflows.

TABLE 3—WATER CONSUMPTION IN OFFICE BUILDINGS

Building Type or Utility	Consumption, Gal per Hr per Person
Competitive	3.8
One owner with kitchen, laundry and air conditioning	9.0
One owner with kitchen and laundry, no air conditioning	7.3

Determining Tank and Pump Capacities

Practically all engineers can agree on when a tank and house pump are required, but few can agree on the exact capacity or ratios of capacities between the pumps and the tanks. The following information was taken from actual test records and, therefore, are proven facts. Whether they can be altered and if so, how much is a moot point. There are too many variables to establish quantities by an empirical formula. Data are still being collected in order to revise these to coincide with the trend of the American population which is toward a larger consumption of water per capita.

Capacity for Fire Reserve

Capacity for fire reserve has been established by local laws and ordinance along with the requirements of the National Board of Fire Underwriters. Fire experts expect a reserve of 3500 gal for buildings with one fire standpipe riser and 5000 gal for buildings with more than one fire standpipe riser unless two tanks are used. In the case of two tanks, each tank must have a reserve of 3500 gal.

The separate reserve for sprinkler systems shall be at least 5000 gal or sufficient water storage to supply 25% of the number of sprinkler heads in the protected fire area for at least 20 minutes. However, this is a rule that may be varied by the authorities because in cases of large fire areas, the storage becomes phenomenal and therefore must be modified.

The penthouse, although it may be protected by standpipe and sprinklers, is not considered the highest usable floor. However, if there is a hazardous occupancy in the penthouse, the tank should be elevated to give the required minimum 25 ft static pressure in the lines in this area, in lieu of the 25 ft above the highest usable floor. Most fire departments do not permit tank installations that would give an excess of 150 lb static pressure at the lowest hose valve, whether or not pressure reducing valves are installed on the line. Therefore, this requirement would establish the minimum number of zones that are required. The departments permit pressure reducing valves to be installed in the pressure zone between 55 psi for 2½-inch hose stations; 85 psi for 1½-inch hose station, and the maximum of 150 psi.

The sprinkler and standpipe reserve can be incorpo-

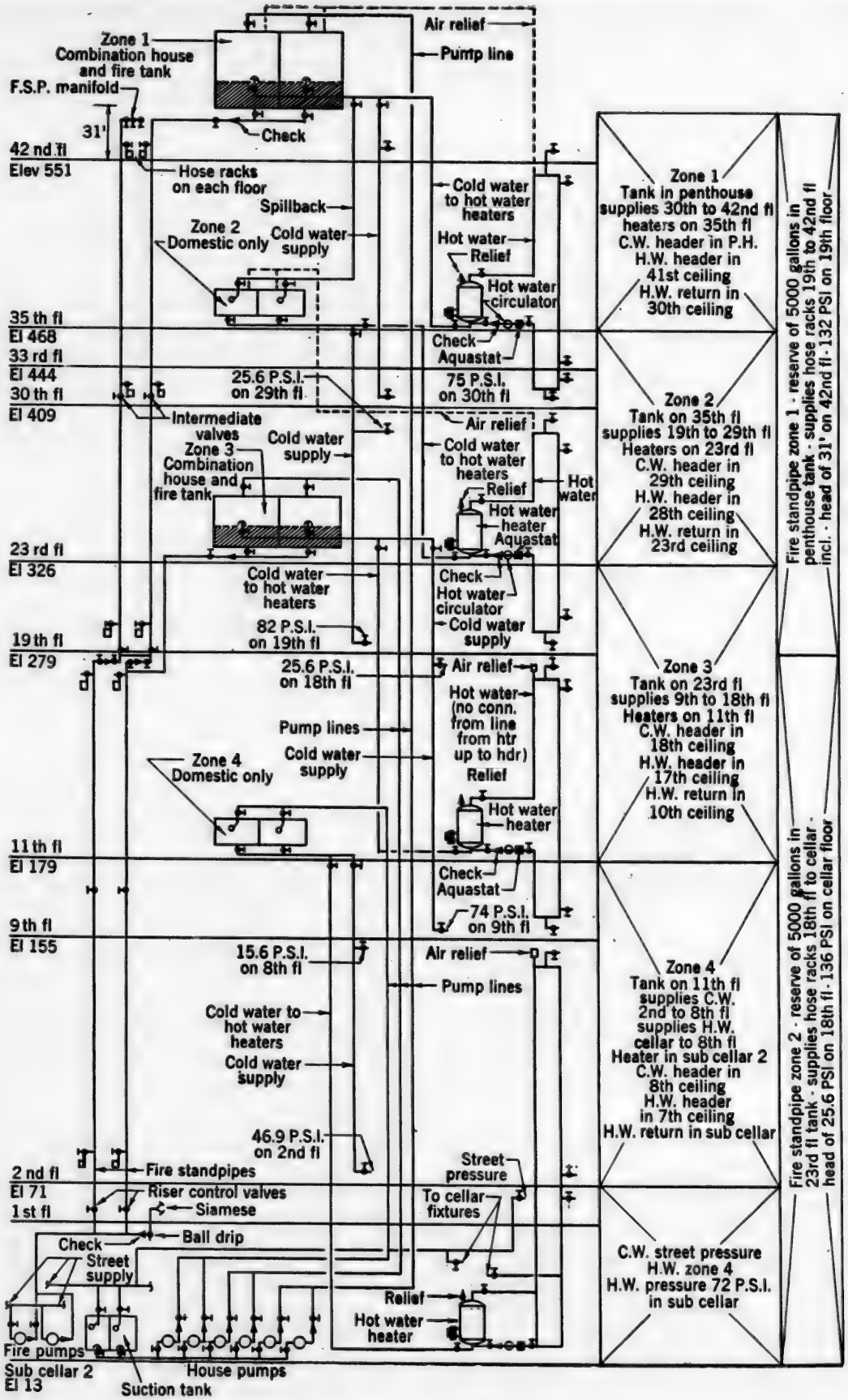


Fig. 7. Gravity water supply system without pressure reducing valves, serving four zones.

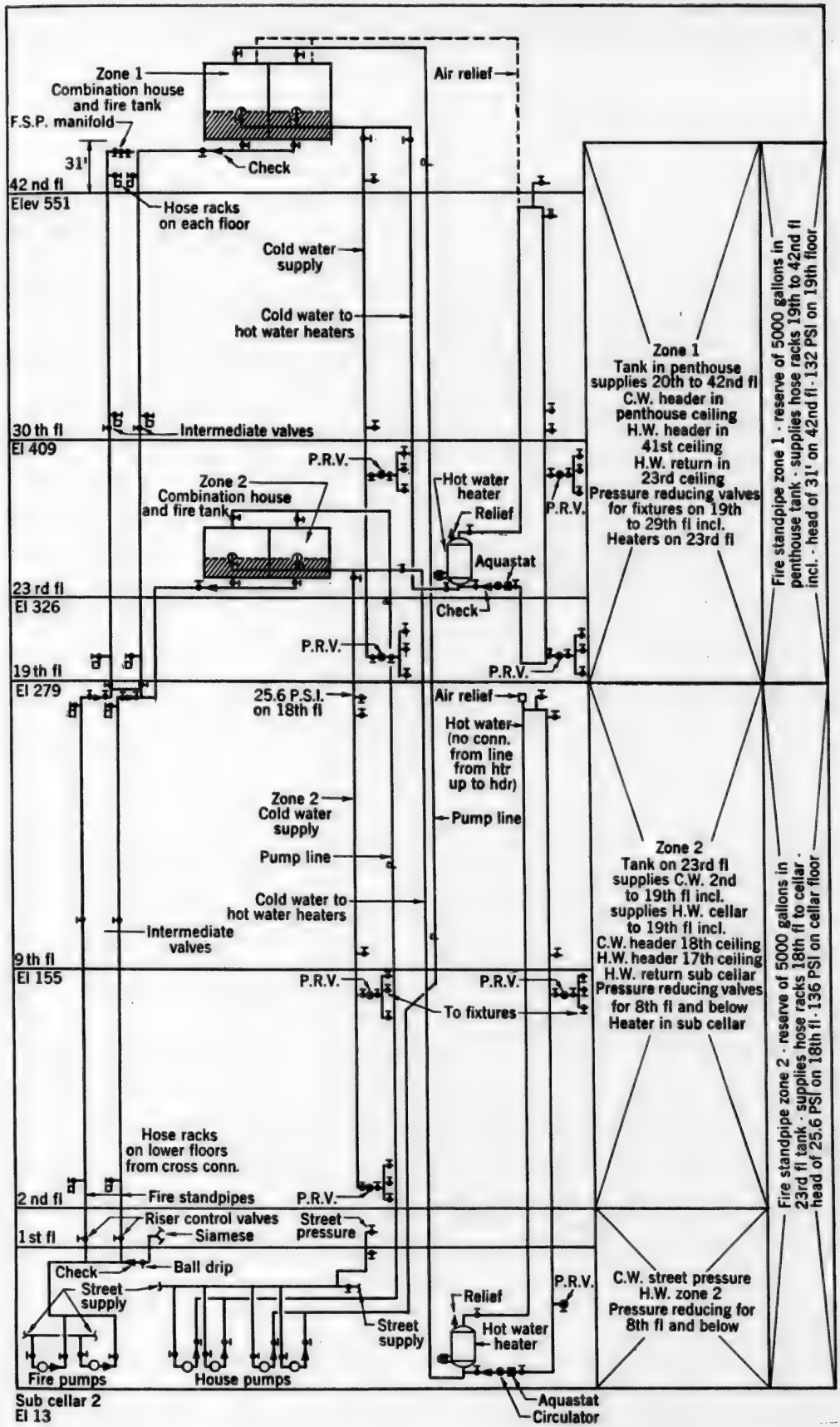


Fig. 8. Gravity water supply system with pressure reducing valves.

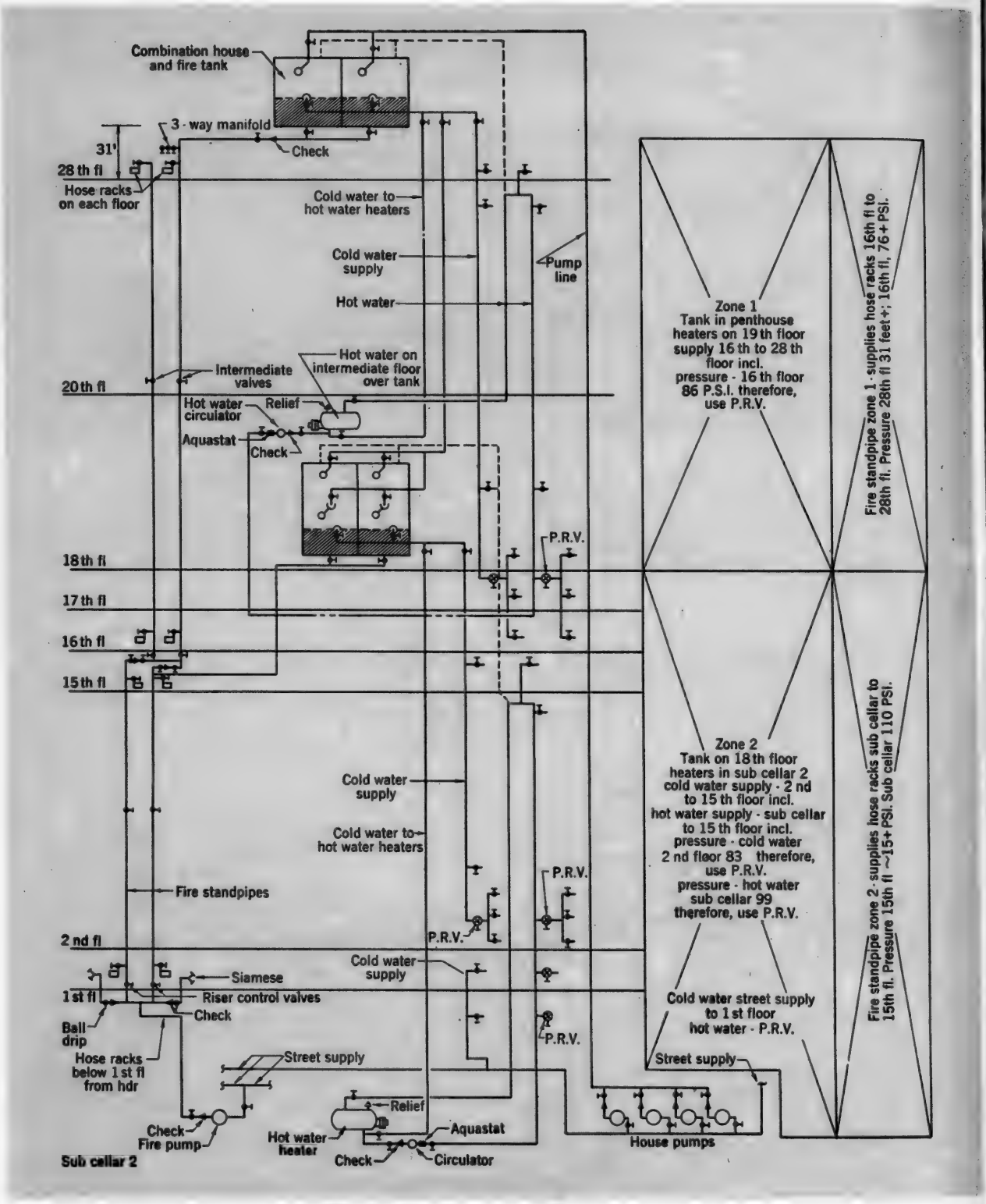

Combination house and fire tank
3 - way manifold
Check
31'
28 th fl
Hose racks on each floor
Cold water to hot water heaters
Cold water supply
Pump line
Hot water
Hot water on intermediate floor over tank
Intermediate valves
20th fl
Hot water circulator
Relief
Aquastat
Check
P.R.V.
18th fl
17th fl
16th fl
15th fl
Zone 1
Tank in penthouse heaters on 19th floor supply 16 th to 28 th floor incl.
pressure - 16 th floor 86 P.S.I. therefore, use P.R.V.
Fire standpipe zone 1 - supplies hose racks 16th fl to 28th fl. Pressure 28th fl 31 feet +; 16th fl, 76+ PSI.
Zone 2
Tank on 18 th floor heaters in sub cellar 2 cold water supply - 2 nd to 15 th floor incl.
hot water supply - sub cellar to 15 th floor incl.
pressure - cold water 2 nd floor 83 therefore, use P.R.V.
pressure - hot water sub cellar 99 therefore, use P.R.V.
Fire standpipe zone 2 - supplies hose racks sub cellar to 15th fl. Pressure 15th fl ~15+ PSI. Sub cellar 110 PSI.
Cold water supply
Cold water to hot water heaters
Fire standpipes
P.R.V.
2 nd fl
Cold water supply
Siamese
1 st fl
Riser control valves
Check
Ball drip
Hose racks below 1 st fl from hdr
Cold water street supply to 1 st floor hot water - P.R.V.
Street supply
Relief
Check
Fire pump
Hot water heater
Aquastat
Check
Circulator
House pumps
Sub cellar 2

Fig. 9. Gravity tanks—spillback system.

rated in the same tank as the domestic supply, thus eliminating additional tanks and equipment area. The connections from this combination tank shall be taken so as to provide the required storage for each system with the sprinkler reserve in the lowest portion of the tank followed by the fire standpipe reserve with the domestic water at the top. Pumps used to supply fire reserve tanks shall have a capacity of not less than 65 gpm with the fill pipe not less than 2 inches in diameter. The discharge to the standpipe and sprinkler system must be provided with a bronze strainer within the tank.

The house pumps are generally sufficient and are an acceptable method of filling the tank containing the fire reserve. However, in some regions, a fire pump is

required in addition to the reserve supply, while in other communities the reserve supply is not acceptable and an automatic fire pump or pressure tank must be employed.

Domestic Supply for Hospitals (House Tanks)

The amount of water consumed in hospitals is predicated on the type of hospital being considered—whether it has a physicians college, an out patient department, private patient pavilions, babies' hospital, etc. Most hospitals today contain all these facilities within one building and therefore, only one figure of total consumption is required.

There are two main factors that are generally known about a hospital in its design state, that is, the proposed building cube and the number of patients to be hospitalized. Because the building cube is a constant, the data accumulated was correlated to this item and records were kept over a period of years in an expansive hospital having separate building for some of the before mentioned facilities. The records at this major and other minor hospitals averaged a daily consumption of .075 of a gallon per cubic foot of building.

It was further estimated that the peak hour use, which would be required for the house tank design, was approximately 80% of the daily load which was used in a 14-hour day. Hence:

peak hours use, gallons =

$$\frac{\text{daily load} \times .80}{14 \text{ hours}} \times \text{building cube in feet}$$

$$\text{peak hour use, gallons} = \frac{.075 \times .80}{14} \times \text{building cube.}$$

$$\text{peak hour use, gallons} = .004275 \times \text{building cube.}$$

If the hospital in the process of design is one under the jurisdiction of the Public Health Service or the U. S. Army, the above data must be modified as it is necessary to follow the design procedure outlined in the publications of the Public Health Service or the Army Corps of Engineers Manual. The formula for tank capacity use by the Army is:

$$\text{Gallons per day} = \text{number of beds} \times 450$$

The domestic supply placed in the tank shall be equal to at least one-half hour supply. In example, let us assume a hospital with a cubical content of 3,000,000 cubic feet. The lower floors of the hospital can be supplied from street pressure while the upper floors require a house tank to provide a sufficient water supply. It is further assumed that the portion fed from street pressure is 1,000,000 cu ft in which the cubage of the laundry is included:

$$\text{Tank capacity, gal} = \frac{.004275\ (3{,}000{,}000 - 1{,}000{,}000)}{2}$$

$$= 4275 \text{ gal}$$

The pumps used for this installation should have a capacity equal to the hourly load and, therefore, they should have a capacity of

$$\frac{8550 \text{ gallons per hr}}{60 \text{ min per hr}} = 143 \text{ gal per minute}$$

In a hospital, two pumps with a capacity equal to the hourly load should be installed because full breakdown service is essential to the operation of the hospital. In lieu of this, it may be more economical to provide three pumps, two of which would equal the hourly load and the third as a standby. The above example would require two 150 gpm pumps or three 75 gpm pumps depending on the economical selection.

Domestic Supplies for Office Building House Tanks

Office building water consumption is based upon the type of office building—whether it is a competitive building for tenants or whether it is a building that is constructed solely for the owner's use. Tests have shown that the consumption of water varies tremendously from a peak hour of 4 gallons per person for a competitive building up to 9 gallons per person for a building built for an owner's personal use. There are definite reasons for this vast difference which are as follows:

1. Regimentation of personnel under one owner; that is to say that there are fixed lunch hours and coffee breaks and all personnel abide by these hours. In a building of tenants of different enterprises, the lunch hours are greatly staggered with a large percentage of people eating in adjacent restaurants.
2. In large corporations occupying one building, the trend has been toward the inclusion of cafeteria and kitchen facilities within the building. In addition, laundry facilities are provided for the laundering of table linens and maintenance helpers' work clothes.
3. Air conditioning may be given as an option in a competitive building but has been more or less the rule in single occupancy buildings.

Therefore, depending on the type of building, a median must be established. Table 3 shows a breakdown of some of the figures obtained from actual tests. Let us assume an office building with approximately 28 stories and each floor having a rentable area of 450,000 square feet. A generally accepted figure for determining population is 100 sq ft or 125 sq ft per person. We will use 100 sq ft as our base figure. The water storage required would be as follows:

For competitive buildings:
4500 persons $\times$ 3.8 gal/person/hour = 17,100 gals.
For building with single occupancy:
4500 persons $\times$ 7.0 gal/person/hour = 31,500 gals.

A modification of these figures would be required for a building which has a combination of these usage factors. The air conditioning load can be figured by using figure in Table 3 or by separate formula described separately within this article. Tank capacities for an office building should be equal to one-half hour supply and the building zoned in accordance with pressure and storage. In the event that a spillback system is elected for use, the total storage capacity is equal to the sum of the storages in each of the tanks regardless of population supplied from each tank provided that the spillback lines are sized to furnish sufficient water at peak hour flow. Pumps for office buildings should be provided in duplicate with each pump having a capacity equal to the hourly load. This is done purely for economic reasons. When the building's water supply fails, it would be necessary to release the office personnel and

TABLE 4—WATER CONSUMPTION IN APARTMENTS
AVERAGE OF 3 PEAK HOURS

Per Unit	Gallon
Apartment	23.6
Person	6.7
Room	5.4

one day of lost work for an entire office staff would more than justify the duplex pumps.

Figure 9 shows a typical zoning riser diagram for the above problem while Fig. 7 shows a more complex system for a 40-story building which can be modified in accordance with Fig. 8 if the use of a considerable number of pressure reducing valves is acceptable to the engineer.

Apartment Buildings

Table 4 gives actual figures determined from readings from both low cost and general apartment houses. The water consumption in this type of building hits peaks of longer duration, hence, the average of the three peak hours.

In groups of buildings, (a project) it is often preferable to place the house tank on one building and supply all buildings by an underground distribution line which would feed upward in all the buildings. No connections should be taken off the downsupply to the distribution lines as any repair required at these connections would cause a complete shut down of the project.

The tanks for this project should have a capacity equal to the water required for the peak hour and the pumps should be designed to furnish in excess of the peak hour load.

Let us assume a project to house 180 families in three buildings. The average population per family is four; hence, the capacity of the tank would equal the following hourly supply:
180 families $\times$ 4 persons/family $\times$ 6.69 gph/per. = 4817 gallons domestic storage (6.69 is obtained from Table 4).

Laundry

Laundries are generally located on the lower floors of a building and are fed from street pressure but on rare occasions, it is necessary to supply a laundry from a house tank. This supply should be considered separately from any of the other domestic supply and should be added to the tank capacity. The most practical figure for water consumption is based on the pounds of laundry processed. (Table 5) This is a true figure regardless of the type of building occupancy. The consumption of water is 5 gal of water for each pound processed. Of this amount, 3½ gal must be hot water at 180 deg.

The hospital poundage for processed laundry is approximately 15 pounds per person or patient which is about 35 lb per hospital bed. An office building laundry can usually be estimated by the pounds of wash or by knowing the type of machines as the capacity of dry wash can be obtained from the manufacturer.

MISCELLANEOUS CONSIDERATIONS

Consideration will now be given to other items such as water closets, air conditioners and heating.

Back Outlet Water Closets

If the use of back outlet water closet type of fixture is contemplated, then the pressure at the top floor becomes very critical; these fixtures require a pressure of approximately 20 lb to give good results (manufacturer's recommendation). The house tank, if set only 31 ft above the highest floor, would provide insufficient pressure. In order to use this type of fixture, the piping at the upper floor should be oversized and the fixtures specified to operate at a 13 psi residual. This can be accomplished in the factory test of each fixture and said fixtures can be so marked for installation. The reason that the manufacturers state the higher pressure, is that there are no rejects at this pressure and optimum flushing is obtained. The other alternative solution would be to raise the tank or install a pressure system for the upper floors.

Air Conditioning Load

The trend in practically all of the modern type of structures is to include air conditioning to some degree or provisions to install air conditioning as tenants require. This load is very considerable and should not be omitted from the basic calculations. Although the table on water consumption shows a basic figure, it would be more accurate to use the actual tonnage of refrigeration that must be provided. The air conditioning equipment may be either steam driven or electric driven and the consumption of water varies with the type of driving unit selected. The drift factor would remain constant at about 0.2% while the evaporation factor varies in accordance with the following formula:

Steam Drive

$$\text{Evaporation factor} = \text{tons} \times \frac{3 \text{ gpm}}{\text{ton}} \text{ (circulation)} \times 0.1\% \times 21 \text{ deg temp}$$

Electric Drive

$$\text{Evaporation factor} = \text{tons} \times \frac{3 \text{ gpm}}{\text{ton}} \text{ (circulation)} \times 0.1\% \times 10 \text{ deg temp}$$

As these loads are maximum and of fairly long duration, when they occur it can be coincidental with the peak hour of water consumption. Because of this, it is necessary to provide the additional load in the pumps and a very small amount in the tank—about 10 to 15 minute supply would be ample. This storage would be supplied only to the tank supplying the cooling towers. The load, when divided between the pumps should be

TABLE 5—WATER CONSUMPTION BY LAUNDRIES

Machine Size, Inches	Lb per Wash	Total Water, Gal
24 x 36	45	225
30 x 30	60	300
30 x 36	75	375
30 x 48	95	475
36 x 36	110	550
36 x 54	165	825
42 x 36	150	750
42 x 54	225	1125
42 x 72	300	1500
42 x 84	350	1650

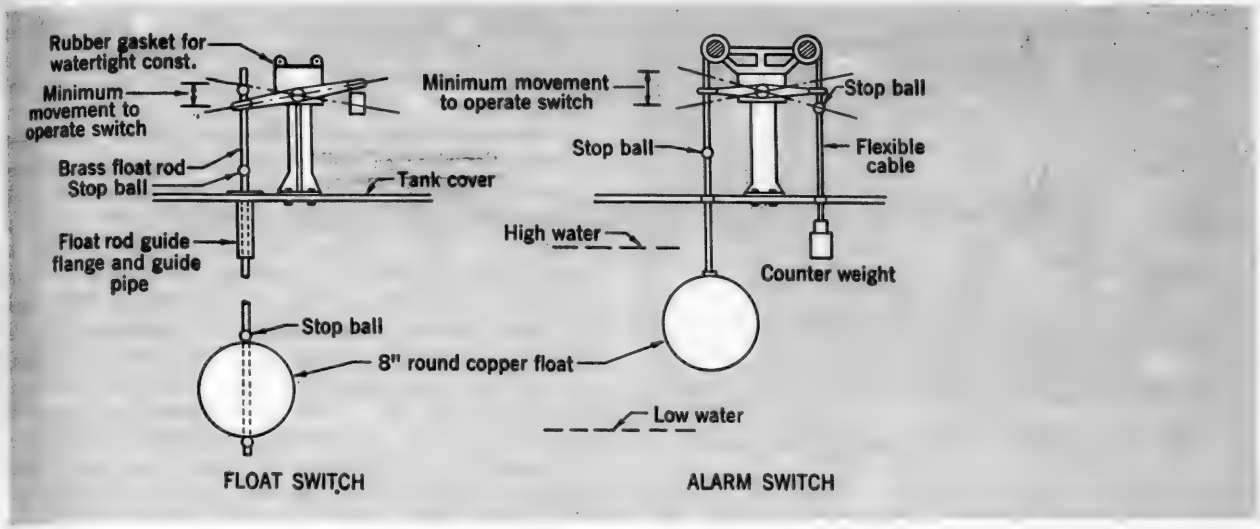


Fig. 10. Details of a float switch and an alarm switch.

included in its entirety in each pump in a two-pump supply (one for service, second for breakdown service) and divided between the load or service pumps when more than two pumps are installed.

Floats

Floats for both alarms and float switches may be enclosed in an open standpipe within the tank. This is done when a tank has a large surface area and the entering water causes erratic surging thus giving false readings as to water level which creates a constant starting and stopping of the pumps along with giving low and high water alarms. By enclosing the float in a standpipe, the surges are minimized and true actuation is obtained.

Float Switches. A float switch, Fig. 10, must be provided for the tank or tanks into which the house pumps are discharging. If there is a two-compartment tank, it is preferable to install a set of floats in each compartment as water service to the building would be uninterrupted when one compartment of the tank is drawn down for cleaning and maintenance. In order that there are no false startings during the time of cleaning, the float switches are transferred to the compartment that is continuing service. This is accomplished by the installation of a multi-pole double throw switch at either the tank level or at the pump control panel. By installing this multi-pole transfer switch at the tank, the wiring to the starter can be common to both sets of floats. Therefore, the cost difference amounts to only the cost of the floats and the switch.

Although some of the pumps are for standby service and can be cut in manually, it is recommended that a float switch for each pump be installed. This slightly additional cost provides additional insurance for constant water supply, as the pump float can be installed at the level of the low alarm and, therefore, would start automatically when the alarm rings. These floats should be wired to a transfer switch, either rotary or double throw, which will enable the operator to select and interchange the rotation of the lag and lead pumps by changing the contact connections of the floats and starter.

Ball Floats

This type float is installed on the supply lines to a suction tank, spillback tank and on a house tank if the street pressure can overcome the static head during periods of low flow and therefore, could fill the tank. Due to the fact that the float switch is not infallible and may stick, many communities insist upon the installation of a ball float in addition to the float switch. This eliminates the waste of water through the overflow in the event that the switch would not break contact thus causing a pump to be continuous running. This method of water conservation would stop the flow of water at the same time as the high alarm rings. This water saving would be considerable in a community with a large population.

Ball floats can be either the pilot-operated type or the ball cock type. The pilot-operated float provides a fully open or closed water passage by using a piston type of valve which depends on the area of the surface in contact with the modulating pressures. The time of closing can be regulated by a valve in the bypass port. The pressure on one side of the piston is relieved by the opening of the float causing the service pressure to open the valve. As the float closes, the chamber is filled by the bypass port forcing the valve to close against the service pressure. Figure 11 shows details of a pilot operated float valve.

The ball cock uses the mechanical principle of a lever. The ball at the end of an arm is forced upward as the water rises. The buoyant force of the ball acts along the lever causing a plunger to close against the discharge pressure. Because of this, the valve closes slowly so there is a tendency of noise to develop due to high water velocities just prior to shut-off.

Alarms

Both a high and low alarm should be installed in each tank and in each compartment of a two-compartment tank. The low alarm would indicate that the pumps are not keeping up with the demand which usually means a break in a down supply line, an open valve in a draw-off or fireline, or a pump that failed to operate automatically and may be required to be thrown into service manually. The high alarm would indicate that the water has reached the overflow level and would

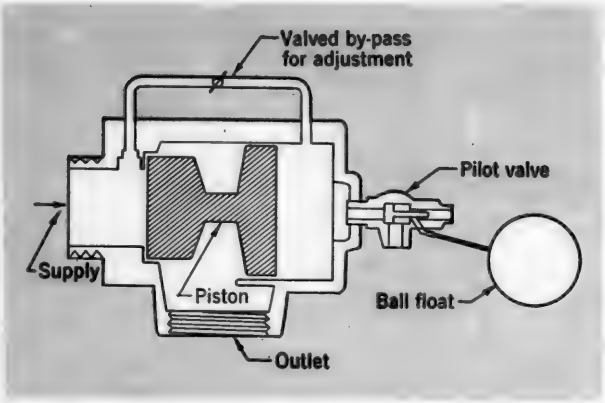


Fig. 11. Section of a pilot operated float valve.

spill to waste. This would be caused by an inoperative float switch. The waste of this water could be prevented by this installation of a ball cock or a pilot operated float valve on the inlet to the tank as previously described or by installing an additional relay in the pump control which would disconnect the power supply to the starter when the high alarm rings.

The alarms should be wired back to a central panel where they would operate both a visual and audible alarm. The bell should be able to be silenced but the light must be wired so as to remain lit until the difficulty has been corrected. The alarms in each compartment may be connnected to a multi-pole double throw switch and a common line taken down from each tank. Each tank should indicate separately on the alarm panel.

Spillback Lines

Spillback lines must be sized to provide for the peak flow and in the case of a fire, the tank sized to provide at least 65 gpm. In order to provide more activity to the water and to allow the tank to draw down, two float valves can be installed at different levels. The upper valve should be sized to accommodate average draw and a combination of both the upper and the lower to provide peak draw. It is not advisable to use the spillback line for any other purpose but filling the lower tank. Although there are no legal restrictions to taking other supplies from this line (i.e. hot water heaters), the varying flow causes varying friction losses which may cause an insufficient water pressure at the topmost floor.

Heating

House tanks must be protected against freezing. When tanks are located within an enclosed penthouse, it is preferable to heat the entire room to about 50 deg. This can be done by using the conventional mode of heating used for the building or by providing unit space heaters.

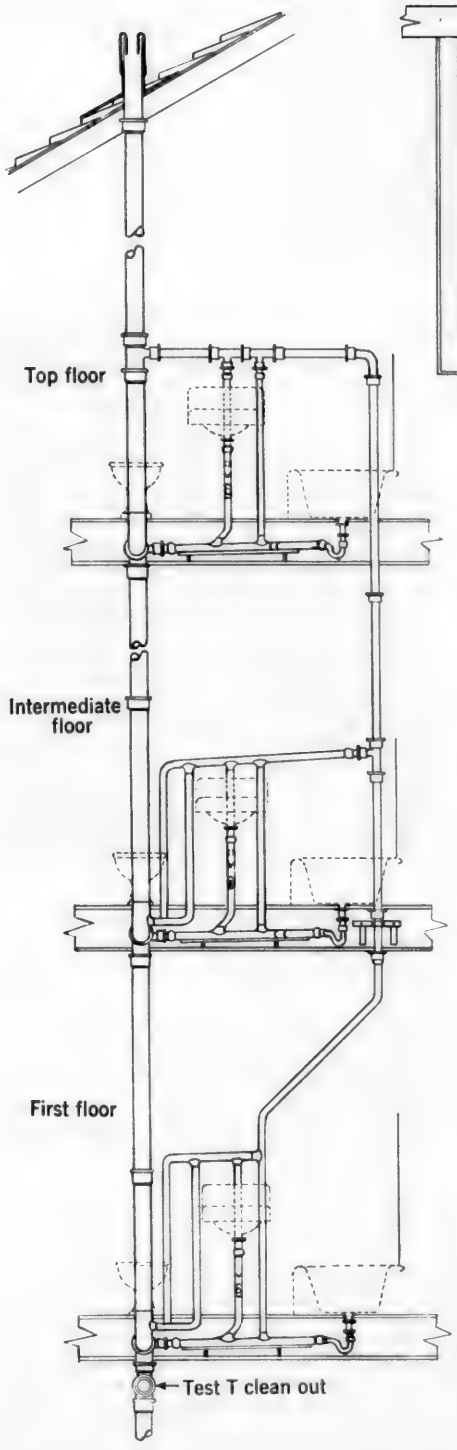
When the tank is located in an open unheated penthouse, the riser as well as the tank must be protected against freezing. If ice forms at the top of the tank, undue stresses would occur which may cause rupture of the tank. This has been the cause of the collapse of many tanks in addition to causing an overflow of water in the event of a frozen float switch. On the other hand, excessive heating could also prove detrimental to the tank structure, particularly wooden tanks. The piping to the tank must also be protected against freezing as an ice plug in these lines would cause the tank to be inoperative as there could be no water flow. The heating is generally accomplished by steam, gas, oil or coal heaters with sufficient capacity to overcome the heat loss and maintain a water temperature of 42 deg during the coldest weather. In standpipe tanks this is accomplished through a gravity circulating system. The cold water is taken from the discharge pipe or from the bottom of the tank. This water then passes through the heat exchange equipment and is heated. The heated effluent rises through a separate hot water pipe into the tank. By this constant circulation and the constant adding of a heated water, it maintains the desirable temperature that prevents damage by freezing. In order to keep the heater sizes to a minimum, the pipe lines to and from the tank should be insulated along with the heaters and its piping. The hot water line can be enclosed in the same insulation as the tank piping thus imparting its heat to the water lines within the insulation. The water circulating piping should be at least 2-inch dia.

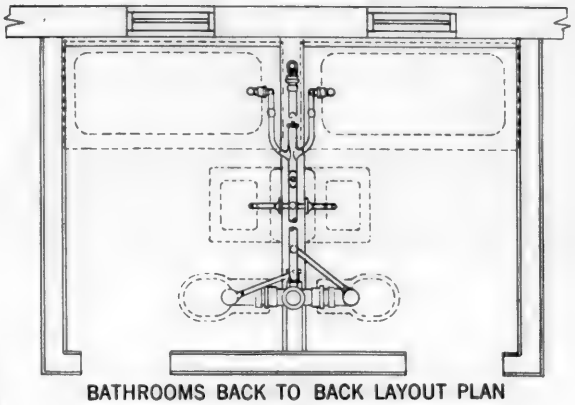
Heating of a tank would not be required for combination house and fire tank in structures where the domestic supply would be drawn upon during all hours of each and every day of the week such as hotels, multiple dwellings and hospitals. However, if there is a chance of any skim ice forming which would cause a float switch to be inoperative, it would be advisable to provide enough heat to prevent this formation or to enclose the floats in a heated standpipe to insure their operation.

Pressure Reducing Valves

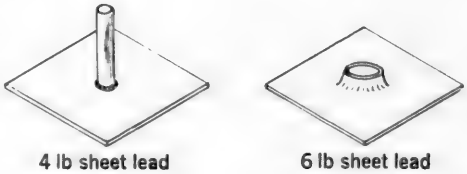
In order to reduce the number of tanks within the building, pressure reducing valves can be installed. These may be either the piston or diaphragm type, but either one requires maintenance. In order to keep them to a minimum, the floor above and the floor below the reducing valve can be supplied from the same valve; hence, one-third of the number of valves.

LEAD PIPE INSTALLATION FOR BATHROOMS





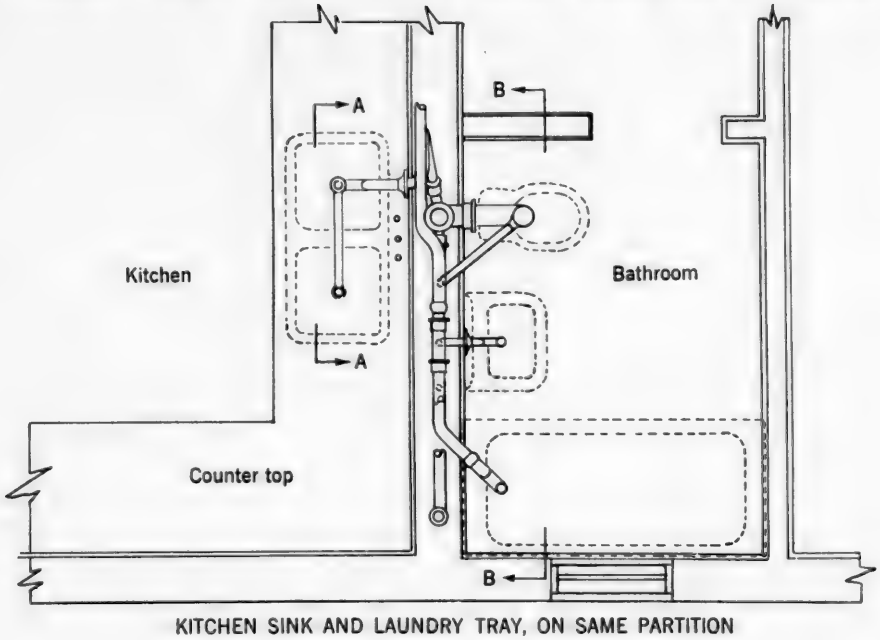
BATHROOMS BACK TO BACK LAYOUT PLAN



ROOF FLASHING MADE ENTIRELY OF LEAD
ANY ANGLE OR FLAT

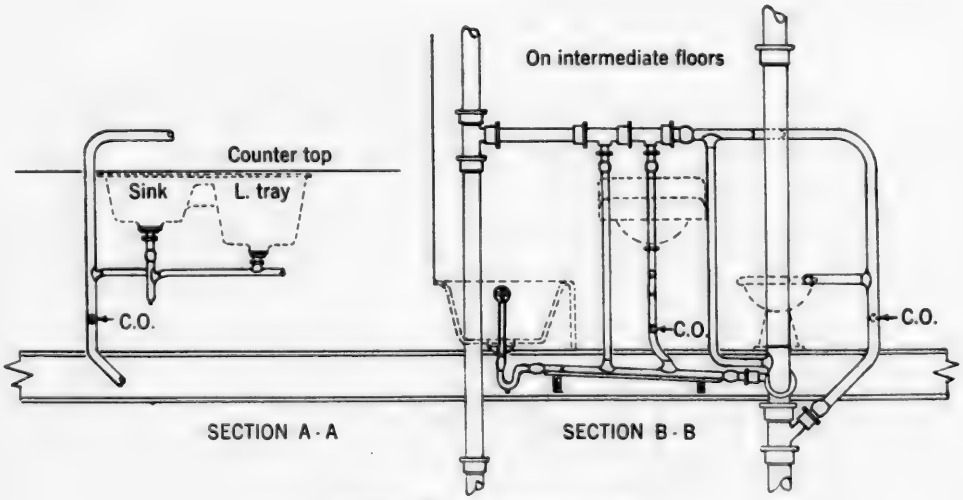
Water closet bends, 4" X. H. lead
Bath traps, 1½" X. H. lead P trap
Vent pipe flashing, 4 lb sheet lead
Waste and vent pipes, 2" class D lead pipe
Waste and vent pipes, 1½" class D lead pipe
Soil stack, 4" cast iron soil pipe
Vent stack, 2" cast iron soil pipe
All pipe sizes according to local plumbing code

LEAD PIPE INSTALLATION FOR KITCHENS



KITCHEN SINK AND LAUNDRY TRAY, ON SAME PARTITION

Water closet bends, 4" X. H. lead
Sink waste pipe, 2" class D lead
Sink traps, 1½" or 2" X. H. lead
Bath traps, 1½" or 2" X. H. lead
1½" or 2" waste and vent pipe, class D lead
Sink C.O.=brass plug wiped in
All pipe sizes according to local plumbing code

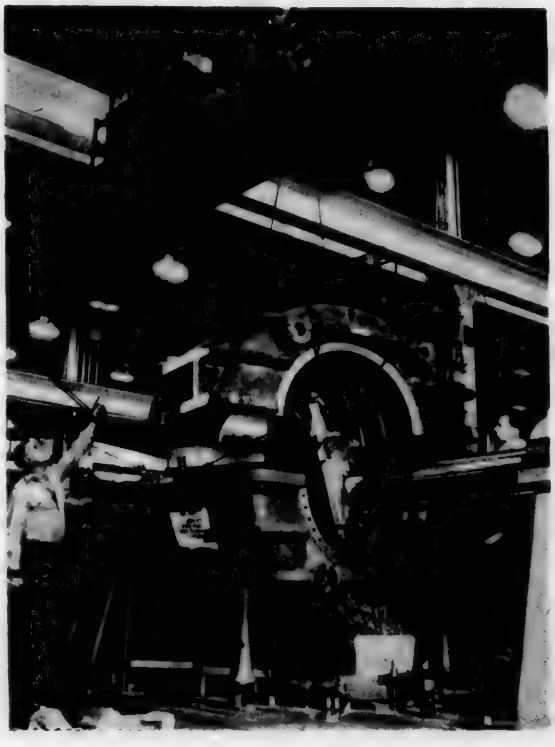


Drawings on This and Reverse Page,
Courtesy of Lead Industries Association, New York, N. Y.

TEMPLE'S SANCTUARY. (Right) This is the sanctuary of the Fairmount Temple, Cleveland, Ohio, described in the January issue (page 76) of this publication as incorporating three different uses of perlite aggregate to solve heating, fireproofing, and acoustical problems. The radiant heating system, designed by John D. Dillon, New York consulting engineer, utilizes cored tile blocks through which warm air passes on its way to wall and window sill registers.

Picture Paragraphs

LEAD-BRICK WALL. (Above) A 2-inch thick wall of lead bricks will help contain atomic radiation in Westinghouse Electric Corporation's new "hot cell" — a compact laboratory designed for nuclear research projects. Laboratory technician Herbert Lacock places one of the 15-lb lead bricks in position. The top surface of each brick is curved so there will be no flat joints through which radiation might penetrate. The object in the top center of photo is a "master-slave manipulator," a mechanical hand which will permit handling of radioactive objects in the cell by remote control.



BORING PROCESS. Two halves of the largest centrifugal compressor made by Carrier Corporation have been bored simultaneously in photo at right. This insures the hairline clearance required for impellers spinning inside at speeds in excess of 900 fps. Compressor will weigh 35,000 lb when fully assembled, and will discharge 30,550 cfm of a hydrocarbon mixture for refining process at Magnolia Petroleum Co., Beaumont, Tex.

Designing Out the Kinks

In Refrigeration Systems—Part 1

M. A. RAMSEY
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The author enumerates some of the common ills which refrigeration systems are heir to, and presents suggestions for their correction or elimination, based upon his experiences as contractor and designer. Topics covered include: temperature-pressure control, preventing liquid failure, and proper oil return. Part 2 discusses liquid carry-over.

REFRIGERATION systems are not foolproof. Some of the mechanical troubles that may develop can be the result of improper installation or the matching of units in a system that are not compatible.

Some of the troubles that have developed in refrigeration systems will be discussed and methods suggested for correcting and preventing such operating defects.

However, a word of caution is necessary to avoid an impression that all refrigeration systems are subject to all the troubles listed. As an analogy, medical books list all the ailments to which man may be subjected, but it is accepted that an individual will only experience but a very small part of the diseases described.

Malfunctioning Systems Were Poorly Designed

Most refrigeration compressors can (and must) receive a return of oil in drops, with the gas. Some of this will run down, through the passages provided, into the crankcase. Some will go into the cylinder with the gas where it helps to lubricate the cylinder walls.

If drops of liquid refrigerant come back with the suction gas, these may separate in the suction space which most refrigeration compressors have, and drain to the crankcase. Should the amount be small, it will probably boil off quickly without causing much oil foaming or reducing the viscosity of the oil too much.

Some of these drops may go into the cylinders with the gas. If they are not in large enough proportion to result in a pool of liquid on top of the piston, they may not result in immediate breakage of valves. However, even though the drops are very small and result in no breakage, they can, by mixing with the oil in the machine, cause a considerably increased rate of oil pumping by the compressor and may also lower the viscosity of the oil on the cylinder walls sufficiently to result in excessive piston ring and cylinder liner wear.

Nothing must enter the compressor suction but refrigerant gas and a return of oil at a rate equal to that at which it leaves the compressor discharge or the oil separator. If this is not so, it is the fault of the system, not the compressor. The designer of the system and the one who installs it must make the proper arrangements to assure that only gas with even oil return enters the compressor suction at *all* conditions of operation. This requires careful consideration of, among other factors, the varying load conditions.

It is also the responsibility of the system designer to plan the system in such a way that too frequent stops and starts of the compressor or excessively rapid changes in compressor capacity do not occur. These conditions shorten the life of the equipment and may result in poor control room conditions.

The problems affecting the compressor and some of the possible causes as well as suggestions for their elimination, as outlined in the following discussion, are not always definite statements of "correct" or "incorrect". Some differ from what has become accepted practice. These suggestions are based on actual experience with installations, and systems designed in the manner suggested did perform well or are still performing well after many years of use.

The difficulties occurring with compressors include the following:

1. Valve breakage;
2. Excessive cylinder wall wear;
3. Excessive bearing wear;
4. Crankshaft breakage;
5. Complete wreckage of the compressor as the result of the preceding items or very severe liquid carry-over to the suction.

System Difficulties Outlined

The system difficulties responsible for this are:

1. Liquid refrigerant, entering compressor with suction, may be in normal droplet form which will result in valve breakage, or worse. It may be in a mist or fog form and do no immediately apparent damage, but it will lower the viscosity of the oil on the cylinder walls, causing rapid liner and ring wear. In either case, it may cause an increased rate of oil pumping, resulting in lower crankcase oil level with possible oil pressure failure.
2. Oil enters the compressor suction in too large quantities for short periods.
3. Excessive head pressures or high differences between suction and discharge pressures exist.
4. Oil drains from discharge line back into discharge valve.
5. Refrigerant liquid condenses in various parts of the compressor or suction line during an idle period of the system, or in one compressor in a multiple compressor system.
6. Discharge temperatures are excessive due to high ratio of compression or too much superheat in suction.
7. Supply of liquid-to-liquid injection valves fails.
8. Oil temperature during operation is too high.

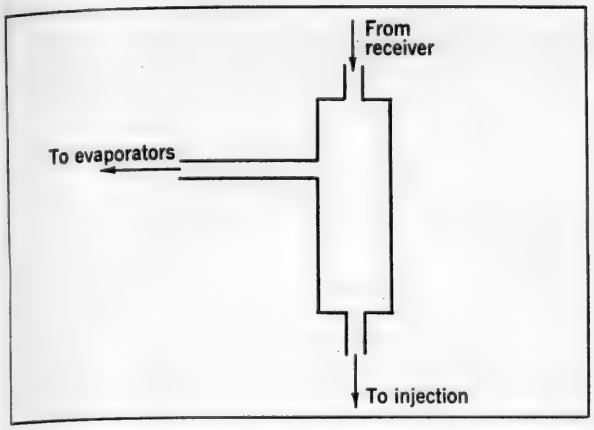


FIG. 1.

Suggestions for correction or elimination of the problems are given. The suggestions are approximately in an order from the simplest to the more difficult.

Temperature-Pressure Control

Head pressures, compression ratios, etc. are usually selected at the time of design, and the selections should be within the limitations given by the compressor manufacturer's specifications. The high- and low-pressure cut-outs should be set to give as much protection as possible. For some systems, a thermostat should be installed to stop the compressor if the discharge temperature or crankcase temperature exceeds a predetermined limit.

All parts of the compressor and any part of the suction line between the compressor and any suction trap must have a temperature higher than the temperature in any part of the system containing liquid and connected with the compressor. Pump-down cycles (with timer contact to restart on pressure rise, if necessary) will keep the suction-side pressure low and avoid liquid slugs at start, as well as reduce the amount of refrigerant in the crankcase oil.

In a fairly large system which may be idle for appreciable periods, a small compressor may serve as a pump-down compressor. If there are two or more main compressors in parallel with check valves in their discharges, a small solenoid controlled by-pass between discharge and suction of each machine, which is open when the respective compressor is idle, will result in keeping everything from the check valve back to the expansion valve at a pressure well below that at which condensation would occur. With such an arrangement, crankcase heaters are unnecessary.

When an outside evaporative condenser is used, it may be best to have it start whenever the pressure of the refrigerant inside it exceeds a predetermined point, regardless of whether or not the compressor is operating.

If any part of the circuit is cooler than another part connected with it and containing liquid, the liquid will evaporate from the warmer section and condense in the cooler. The crankcase of a compressor, with its heater maintaining 110 deg F, may not condense the refrigerant gas while the top of the cylinder and the head may be at 90 to 100 deg, and condensate gases from an evaporative condenser at a temperature of 100 deg or over.

Evaporative condensers that are located on roofs, without the control previously mentioned, may easily have higher temperatures than 110 deg. Careful consideration should be given to all temperature-pressure conditions when designing a system. Loops or traps of any type in the discharge lines cannot help this condition.

Preventing Liquid Failure

In any system there will be times when the charge of refrigerant may get a little low. It is important that the liquid supply to the injection for intercooling or unloaded cylinder bank cooling continue—at least until the liquid in the system is so low that it will become apparent in poor performance. The maintenance of liquid supply to the injection should be assurred by a small vessel in the liquid line, as shown in Fig. 1, or a pot at the outlet of the receiver, as shown in Fig. 2. Also, wiring diagrams should be so arranged that liquid injection operates during manual as well as automatic operation. There have been some wiring diagrams in which this was not the case.

Minimum Superheat

There seems to be ample evidence that fine refrigerant droplets can be mixed with the gas even at 5 deg superheat. When superheat is as much as 10 to 15 deg, the fine drops appear to be eliminated. (It should be realized, though, that liquid refrigerant can run along one side of a pipe, while gas with a rather high superheat passes through most of the cross section. Differences of at least 100 deg have been observed.) It is, therefore, important that all but fine drops be eliminated and the gas superheated at least 10 to 15 deg before it enters the compressor. Greater superheats are objectionable only if they result in a too high discharge temperature or a too high compressor temperature, the latter particularly where cooling of crankcase oil is not used. With some refrigerants, greater superheats may reduce compressor capacity and increase power per ton of refrigeration.

Oil Foaming in the Crankcase

Oil separators are usually constructed to drain any liquid they contain to the crankcase. If refrigerant in any quantity is mixed with the oil, it will be drained with it, and the results will be excessive foaming of oil and loss in viscosity with damage to the compressor. A solenoid valve, controlled by a thermostat responsive to the temperature of the lower part of the separator, and set at a temperature at least 10 deg above the highest expected condensing temperature, will assure the return of reasonably refrigerant-free oil to the crankcase.

Another method, probably simpler, for controlling this is the use of a superheat control valve, commonly called a thermal expansion valve, with an orifice so sized that the temperature of the oil returned to the crankcase is at least 15 to 20 deg above that corresponding to saturation.

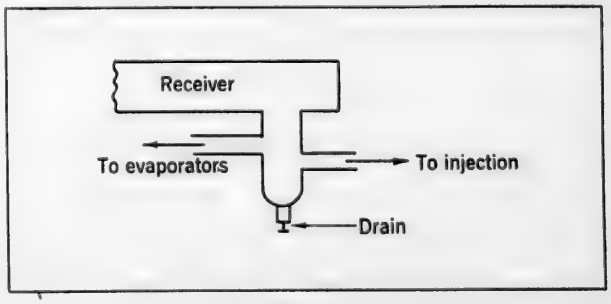


FIG. 2.

If the standard valve of this type is used, it will be closed whenever its outlet pressure is above that corresponding to about 60 deg. The standard, so-called gas charged valve, performs in this way.

Oil Drain-Back to Compressor

The discharge line from the compressor must either pitch down to the oil separator or the condenser, or it must turn down to form a loop before rising to the coil separator or condenser. This avoids drain-back—to the discharge space of the compressor—of any oil coating the inside of the discharge line.

Oil Failure

Whatever method used to control oil return, it can fail, and the oil failure control is depended on to stop the compressor if this happens. Its heating element should only be energized when the compressor is operating and there is no oil pressure differential. If the heating element is connected during periods when the compressor is not in operation, there will be damage and probably burn-out of the oil failure switch.

All safety controls should be checked periodically. A simple arrangement for checking the oil failure control is the installation of a ¼-inch OD, three-way valve, as shown in Fig. 3.

Normally, the valve will be in the position connecting *1* and *2*, with *3* closed off. When it is desired to check the operation of the switch, the valve is changed to the other position and both sides of the switch will be at crankcase pressure. The compressor should stop in the time set, around 90 sec. If it does not stop, the switch is defective. If it stops, the three-way valve can be returned to the normal position and the compressor restarted. This method allows checking without affecting the actual lubrication. Accidentally leaving the valve in the wrong position will do no harm, but merely cause the compressor to stop shortly after it is started.

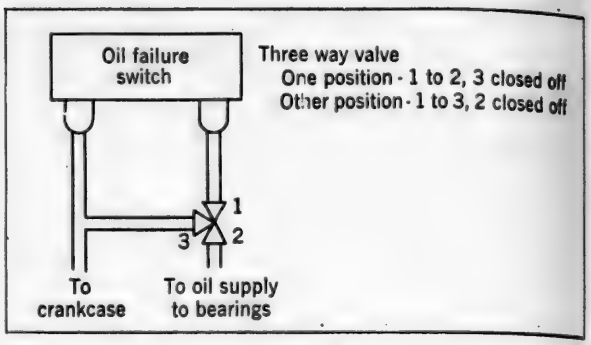


FIG. 3.

Since this valve would only be used every month or two, and should not be too accessible for unintended operation, it is suggested that it be a packed valve with cap rather than a packless valve.

If an oil cooler is used, the oil pressure connection for the oil failure switch and the oil gage should be made to the line leaving the cooler so that they will measure the *net* pressure to the bearings, etc.

How Does Conductivity Vary with Moisture Content?

A single coefficient of thermal conductivity for a given building material does not give a true picture because the thermal conductivity varies considerably with moisture content. Furthermore, the factors that effect the moisture content of building materials are diverse. The type of heating system, the manner in which the building material has been applied, the humidity of ambient air, and the wall exposure must be taken into account.

For some time researchers in many countries have been seeking reliable data to guide the heating and air conditioning engineer. As yet, there are insufficient data.

A report on the status of this world-wide research effort, by J. S. Cammerer, in Warme und Kaltetechnik, 1939, is still valuable in that it presents the problems to be tackled in simple, lucid terms. The article is available in English translation from Division of Building Research, National Research Council, Ottawa, Canada, for two dollars. Known as publication TT-317, its title is "The effect of moisture on heat transmission through building materials—a review of the international literature."

Procedure

The author explains that investigations may follow this general pattern:

First, there must be a determination of the thermal conductivity of the material under investigation in its dry state. A distinction is made between the absolutely dry state and the air-dry state. Failure to make this distinction may lead to erroneous interpretation of data.

Secondly, there must be determined the manner in which the thermal conductivity varies with moisture content, either by measurements in laboratories or by tests on buildings.

Finally, there must be conducted tests to determine the moisture content of buildings under various external and structural conditions.

Organic and Inorganic

Investigation into the properties of inorganic materials is more difficult than that for organic, because the moisture content of the former varies in a much more complex way, the author states. Thus, if brick is put between two plates, simulating inside and outside winter conditions, most of the moisture runs to the colder plate and the resulting uneven moisture distribution results in an atypical coefficient, because in practice the cold side of a wall is exposed to relatively dry air.

But the moisture content of organic materials, as cork slabs, Mr. Cammerer says, is not present in the form of droplets or as a film of water between and on the solid constituents, but is bound in the cell membranes, and the problem of unequal moisture distribution does not generally arise. However, there are other interesting phenomena, as, for instance, in the case of wood, whose thermal conductance varies somewhat according to the direction of heat flow relative to the direction of the grain.

One set of data quoted by the author gives an inkling of the type of data available as of the writing: The test points for Celotex can be represented by a straight line.

Fig. 1. Letters on roofs identify buildings on campus. See text for key.

Does Air Conditioned High School Mark Beginning of a Trend?

The way in which this Texas high school was air conditioned takes on significance in view of gaining acceptance of year-round use of school plant for adult education and recreational use as well as a 12-month school year for the children. Its campus-type plant engendered an interesting zoned heating-cooling layout, details of which are given.

AN air conditioning system for what is believed to be one of the country's first completely air conditioned high schools is attracting attention from engineers and architects because of the suggestion that this may indicate a trend in school building programs. There are those who believe that year-round air conditioning may provide significant relief to the critical shortage of school facilities by making comfortable classroom facilities available throughout the year. Furthermore, the predicted shorter work week for industry will necessitate a continuous program of enriched spare time activities for adults which will be reflected in increased use of the school plant 12 months a year.

Campus-Type Plant Creates Zoning Problems

Scheduled for completion in 1958, San Angelo High School, San Angelo, Tex., will accommodate 1800 to 2000 students in a campus type plant located on a 30-acre site. The new project consists of 12 buildings. These include (See Fig. 1) separate academic units for sophomores (A), juniors (B), and seniors (C), a library (D), an electives building (E), administration-cafeteria building (F), a fine arts building (G), shops, (H), physical education building (J), and an 1800-seat gymnasium with an enclosed swimming pool (K), and circular auditorium (L). Construction costs will be approximately $2,867,000.

The many separate areas created by the campus-type plan will have widely varying heat loss and gain characteristics as a result of different design, exposure, and occupancy. Some areas will require cooling at a time others require heating. For example, because of relatively high heat gain from lights and people, it is logical that the auditorium and cafeteria will require cooling while other portions of classroom areas may require some heating. Maintaining comfort conditions, therefore, will necessitate an infinite number of steps of heating and cooling capacity from approximately 5 to 100% of total load.

System Centralized

To meet the variable cooling requirements, two 200-hp Trane Centravac hermetic centrifugal compressors with automatic capacity control will chill water for the central system. The compressors, connected in parallel, and two boilers delivering two separate water temperatures, will be located in a central equipment room (See Fig. 2) and supply chilled or heated water through a network of large piping loops running through underground tunnels around the campus. Each building will have its take-off from these loops and its own circulating pump. Air will be handled by 33 of the company's units in the various zones.

In the academic units which are two classrooms wide, split by a central corridor, and six to twelve classrooms long, it was architecturally desirable to locate the air handling units in individual equipment rooms in the middle of the corridors. Ductwork furred into the ceiling will deliver conditioned air to six adjacent classrooms.

Because of their common heat gain and loss characteristics, all fan units serving classrooms and the library will have a single coil for both heating and cooling. Since humidity will be a problem in these areas, the units' output will be controlled by face and by-pass dampers.

The administration, cafeteria, and gymnasium will be served by units having two water coils, controlled by 3-way valves, one each for heating and cooling.

The shop, physical education building and gymnasium are heated by single water coil units.

Because they are sized for cooling, the single water coil units supplying the classrooms and library employ lower temperature hot water than those water coils in dual-coil units and units for heating only. The two boilers supply water at two different temperatures, high temperature water for the administration wing, auditorium, and physical education building, and low temperature water for the academic wings.

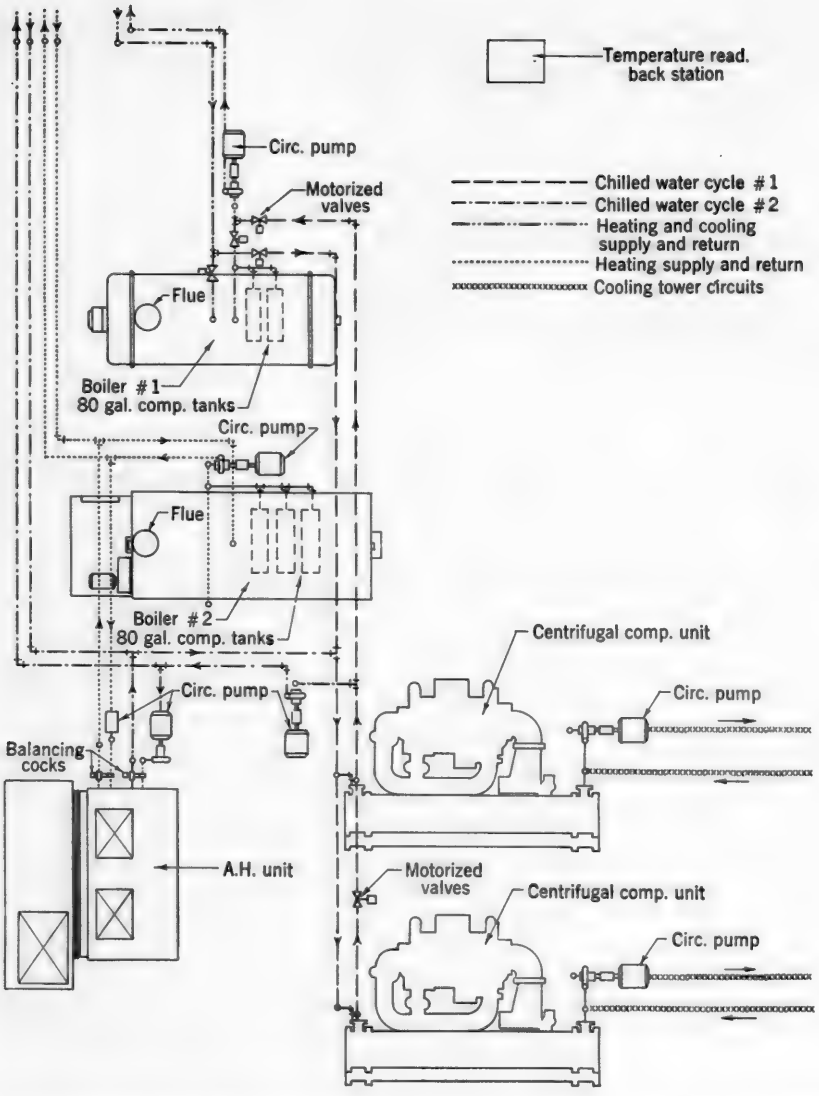


Fig. 2. Details of mechanical equipment. High school was designed by the firm of Caudill, Rowlett, Scott of Bryan, Tex., and Oklahoma City. The air conditioning system was planned by J. W. Hall, Consulting Engineer, of Bryan, and was installed by R. M. Wells Co., Quanah, Tex.

Piping Divided into Three Cycles

One imposing problem was the expected excessive horsepower requirements of the hot and chilled water circulators needed to serve the extreme ends of the piping runs. This was solved by arranging the piping into three main piping zones: one for the heating lines that serve dual coil units and heating units only, one for chilled water lines serving dual-coil units and one for hot water and chilled water lines serving single coil heating and cooling units. Each pump is sized to circulate the maximum demand for water through a single loop which is closed at the extreme end. With this method the pumps selected needed only to be sized to overcome the friction head in the main piping loop. Supplementary pumps in each building and for each major zone in each building handle water quantities out of these main loops and overcome the balance of the head in the system.

The control sequence is virtually automatic. When any one air handling unit is turned on, an end switch will start the operation of the zone circulator. This, in turn, activates the main circulator through an auxiliary switch. The compressors are interlocked so that they will not operate at any time the chilled water circulators are not in operation.

Change-Over Problem Solved

Some trouble was encountered in arranging piping and valves with suitable controls for the change-over from heating to cooling in the piping zone serving the single coil units. Even though the temperature in these lines might fall as low as 100 or 105 deg F, such high temperature water could not be permitted to be directly introduced into the compressors. The problem will be solved by operating both compressors at the time any change-over is made. Warm water from the single coil piping system will then be mixed with chilled water from the other systems.

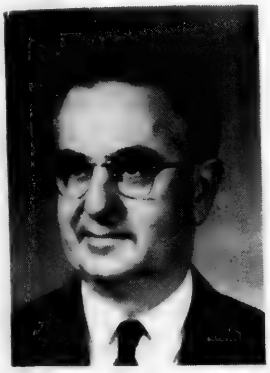
Remote reading of temperatures in any area which has a thermostat will be made possible by the combination of an IBM electronic signal transmitter with the zone electronic thermostats. Only two wires will run in parallel throughout the buildings and these are connected to a common wire to each thermostat. The second wire from each thermostat is switched through an electronic dual coded relay. With this arrangement an operator in the central equipment room can push a button and the signal transmitter will impose a signal on the entire electrical system. This coded signal will permit the reading of a temperature in any selected space.

This Happened in Pittsburgh

Events that took place at the 64th annual meeting of the American Society of Heating and Air-Conditioning Engineers, January 27 to 29, and brief abstracts of the papers presented at the technical sessions and the symposiums.

THE honor of Fellow of the Society was conferred on eight outstanding members of the American Society of Heating and Air-Conditioning Engineers during the 64th annual convention held at the Penn-Sheraton Hotel, Pittsburgh, Pa., January 27 to 29.

The men honored are Albert L. Baum of Jaros, Baum & Bolles, New York, N. Y.; the late Alfred C. Buensod of Buensod-Stacey, Inc., New York, N. Y.; Irwin W. Cotton, Indianapolis, Ind.; Edward L. Crosby, member of Henry Adams, Inc., Baltimore, Md.; Edmund P. Heckel, E. P. Heckel & Associates, Chicago, Ill.; Carl F. Kayan, professor of mechanical engineering, Columbia University; Frank B. Rowley, professor emeritus, University of Minnesota, Minneapolis, Minn.; George M. Simonson, consulting engineer, San Francisco, Calif.



Elmer R. Queer
President

Arthur J. Hess
1st Vice President

This honorary grade can only be conferred on members who have acquired professional distinction and have reached the age of 45 years. Prior to this year, only five members have been so honored.

New Officers

New officers are Elmer R. Queer, director and professor of engineering research, The Pennsylvania State University, president; Arthur J. Hess, president of Hess-Greiner & Polland, Los Angeles, Calif., first vice president; Walter A. Grant, vice president, Carrier Corp., Syracuse, N. Y., second vice president; John H. Fox, vice president, Honeywell Controls, Ltd., Toronto, Ont., treasurer.

Other Officials

New members of the society council elected for three years, are Frank H. Faust, manager, product planning, Commercial and Industrial Air Conditioning Department, General Electric Company, Bloomfield, N. J.; Fred Janssen, standards engineer, Public Service Company of Colorado, Denver, Colo.; James W. May, director of technical training, American Air Filter Company, Louisville, Ky.; Gayle B. Priester, air conditioning engineer, Baltimore Gas and Electric Company, Baltimore, Md.

Elected for three years as members of the Committee on Research are Paul R. Achenbach, chief, air conditioning, heating and refrigeration section, National Bureau of Standards, Washington, D. C.; Stanley F. Filman, assistant director of research, Carrier Corp., Syracuse, N. Y.; Neil B. Hutcheon, assistant director, division of building research, National Research Council, Ottawa, Ont.; Richard M. Stern, partner, Stern & Towne, Seattle, Wash.; Herbert E. Zeil, Albert Kahn Associated Architects and Engineers, Inc., Detroit, Mich.

The F. Paul Anderson Medal was awarded to George L. Tuve, professor of mechanical engineering and director of Bingham Laboratories, Case Institute of Technology, Cleveland, Ohio.

About 880 members and guests registered for this annual convention.

Abstracts of Papers

Following are abstracts of papers presented at the various technical sessions and symposiums:

Direct Solar Radiation Available on Clear Days by J. L. Threlkeld, professor, and R. C. Jordan, professor and head, both of the department of mechanical engineering, University of Minnesota, Minneapolis, Minn. This presents the results of research on the incidence of direct solar radiation during clear days in the United States.

The authors offer a fundamental procedure for determining atmospheric transmission factors for various atmospheric conditions and for various elevations. A more approximate procedure also is described. It involves the concept of a basic atmosphere together with atmospheric clearness numbers. Correlations with ob-

Walter A. Grant
2nd Vice President

John H. Fox
Treasurer

served solar radiation at several localities are included.

A High-Flux Low-Temperature Solar Collector by R. G. Nevins, professor and head, department of mechanical engineering, Kansas State College, Manhattan, Kan., and P. E. McNall, Jr., chief engineer, applied research department, Temperature Controls Group, Minneapolis-Honeywell Regulator Co., Hopkins, Minn., is concerned with a method studied for lowering the loss of heat in a solar collector by reducing the heat transfer area exposed to the environment while maintaining the same amount of incident radiation by the use of a suitable concentrating reflector; the collector temperature is maintained at a relatively low level.

Performance of a Solar Heated Office Building by F. H. Bridgers, partner and R. W. Haines, chief engineer, Bridgers & Paxton Consulting Engineers, Albuquerque, N. M., describes and reports on the first year's operation of a solar heated 4,300 sq ft office building in Albuquerque. The building is heated and cooled by using flat plate collectors faced south and inclined 30 deg from the vertical with a single pane cover of ordinary double-strength glass and a net collector area of 750 sq ft.

On cloudy days and at night, heat is provided from a 6,000 gal insulated, underground solar heat storage tank. A nominal 7.5-ton package water chiller is used as a heat pump in winter and for cooling in summer.

Sun Energy Assistance for Air-Type Heat Pumps by C. P. Davis, Jr., a research engineer, U. S. Dept. of Agriculture and R. I. Lipper, associate professor, Agricultural Engineering Department, Kansas State College, both in Manhattan, Kan., is a progress report on a continuing study of applying a low cost flatplate solar collector to supplement the heat-producing capacity of the air-type heat pump.

Further improvements in collector and storage efficiency are possible, but continued study is needed to determine if the cost for such supplemental equipment will be out of proportion to the operational savings realized.

Cooling Load from Thermal Network Solutions by Harry Buchberg, associate professor, department of engineering, University of California in Los Angeles, demonstrates the flexibility of computing with a DC electric network computer when the influence of many variables is being sought in a complex thermal system. Further, an evaluation is made of the importance of many influencing factors on the sensible cooling load in a light frame test house subjected to the time variable climate.

The ASHAE Air-Borne Dust Survey by K. T. Whitby, assistant professor, A. B. Algren, professor, R. C. Jordan, professor and department head, and J. C. Annis, all of the mechanical engineering department, University of Minnesota, describes the results of the first part of the ASHAE dust survey. A principal objective was to determine the air-borne dust properties that have an effect on the performance of air cleaners. This paper is the result of research sponsored by ASHAE in cooperation with the University of Minnesota and the U. S. Public Health Service.

Natural Convection Cooling and Dehumidifying by L. G. Seigel, director of engineering department, Gannon College, Erie, Pa. and W. L. Bryan, associate professor of heat power, Case Institute of Technology, Cleveland, Ohio, describes tests to obtain basic data on the design of natural convection cooling equipment for certain applications.

Tests were run on bare and finned single tubes and on complete gravity coil units. Performance was studied for conditions of sensible cooling as well as for conditions of dehumidification. The application of these results to practical air conditioning problems and methods of control also are explained.

Stable Hot-Wire Anemometer For Low Speeds by J. F. Kemp, head of the Aeromechanics Division, National Mechanical Engineering Research Institute, South African Council for Scientific and Industrial Research, Pretoria, South Africa, is a description of extensive tests conducted to develop a stable and accurate hot-wire anemometer which would serve as a standard for the routine calibration of low speed measuring instruments ranging from a fraction of 1 foot per second to 15 fps and higher. Performance characteristics, design and pertinent mechanical construction data are set forth in the paper.

Symposium on High Temperature Water

Economic Evaluation of High Temperature Water by E. M. Thompson, consulting engineer, Washington, D.C., includes objectives, problems and possible solutions, comparative costs of high temperature water and steam, maintenance and operation, personnel required, summary of costs, the future for high temperature water, and some recommendations.

Marine Application of High Temperature Water by S. W. Brown, consulting engineer, New York, N. Y., presents information obtained through conversations with some of Europe's outstanding naval architects regarding high temperature water in marine design.

Design of High Temperature Water Systems for Military Installations by C. A. Carter, special assistant to the chief of the Military Design Branch of the Omaha District, U. S. Army Corps of Engineers, and B. I. Sturdevant, brings out difficulties in analyzing the problems confronted and the justification for high temperature water after comparison with steam. Initial, operating and maintenance costs, equipment selection and other topics are considered.

Heating and Air Conditioning a Civilian Airport by H. Charles Broder, mechanical engineer, The Port of New York Authority, New York, N. Y., approaches the problem by example and analysis, concluding with a discussion of the use and potential expanded use of high temperature water.

British and European Design and Construction Methods by George Applegate, Jr., Trowbridge, England, is a presentation of British and European methods of approaching many views previously presented.

Effect of Heated-Floor Temperatures on Comfort by R. G. Nevins, professor and head, and A. O. Flinner, professor; both of the mechanical engineering department, Kansas State College, Manhattan, Kan., is a report on a series of experiments to determine the subjective

reactions of male and female college age students while seated at rest for 60-minute periods under various floor-panel-heated environments. It was concluded that 95 deg F is the maximum floor temperature for comfort. Foot temperatures of 88 to 91 deg F recorded at the end of 60 minutes exposure are the maximum foot temperatures for comfort under the conditions of these tests.

Lighting and Cooled Air Effects on Panel Cooling by L. F. Schutrum, research supervisor, and T. C. Min, research engineer; both of the ASHAE Research Laboratory, Cleveland, Ohio, is the result of research carried out at the ASHAE Laboratory, where it was observed that more than 20 percent of the energy supplied to fluorescent lights can be removed from a room by a cooled ceiling panel at 70 deg. This experimental work was conducted from the middle of 1954 until early in 1956.

Radiant Drafts From Cold Ceilings by Hans E. Ronge, M.D. and Borj E. Lofstedt, M.B. is a report of investigations conducted at the Climatic Physiological Laboratory, Uppsala University, Sweden, with financial support from the Swedish Building Research Board. The influence of the temperature of the ceiling surface on the skin surface of the upper body, naked and clothed, was studied while the subjects were at rest and at work in an air temperature between 60.8 and 68 deg. On the basis of the results obtained, a comfort chart was drawn for the ceiling surface and air temperatures which may be expected to give the same shoulder temperatures on the subject.

Local Climatic Weather Data by W. L. Holladay, partner, Holladay & Westcott, Los Angeles, Calif., describes methods used by a committee in the application of existing climatic weather data to develop and make available recommended design temperatures for local communities.

Appointed by the Research Committee of the ASHAE Southern California Chapter as a Task Force on Outside Design Temperature, this committee devoted over 250 man-hours to develop data for about 450 communities in Southern California, Arizona and Nevada.

A Dynamic Heat Storage System by T. L. Etherington, chemical process research, Research Laboratory, General Electric Company, Schenectady, N. Y. is an explanation of a method for storing latent heat.

Because the capacity (and electrical demand) of the air-source heat pump is greatest when its heat requirement is least and vice versa, ways for storing excess heat during low heat demand periods are most important.

This paper describes a new technique and results for utilizing the heat of fusion of a disodium phosphate material to store latent heat until it is needed.

Improving Attic Space Insulating Values by F. A. Joy, professor of engineering research, The Pennsylvania State University, University Park, Pa., reports the results of tests over a wide range of ventilation rate in two attics, one with a flat roof and the other with a gable roof, each having in the ceiling two inches of fibrous insulation topped by aluminum foil, reflective paper, or kraft paper. A small test house built in the laboratory provided the attics and the work was conducted under controlled, steady-state conditions for the desired testing conditions.

Chimney and Stack Design For Gas-Fired Equipment by R. L. Stone, chief research engineer, William Wallace Co., Belmont, Calif., presents design methods for stacks, chimneys, and gas vents arrived at from a study of the theoretical relationship governing chimney and gas vent operation. The study was directed at developing methods of tabulating important factors affecting draft and capacity in terms familiar to and common in the gas industry.

Pressure Losses and Flow Characteristics of Multiple-Leaf Dampers by E. J. Brown, research assistant and J. R. Fellows, professor, both of the mechanical engineering department, University of Illinois, Urbana, Ill., presents observations and conclusions in determining the resistance of multiple-leaf dampers to air flow, the effect of damper resistance on the control of air flow, and the effect of total system resistance on the flow-control characteristics of any particular damper.

Fan Noise Variation With Changing Fan Operation by R. D. Madison and J. B. Graham, Buffalo Forge Co., Buffalo, N. Y., is a discussion of the fan as a source of noise and a description of changes in the fan sound power as a function of capacity, pressure, size and speed. Several types of centrifugal, axial and propeller fans were studied. These variations are set forth in a series of sound laws for fans.

Symposium on School Heating

The concluding session was a symposium on school heating, ventilating and air conditioning consisting of the following papers:

Educator's View of Need for Good Classroom Environment by G. B. Wadzeck, superintendent of schools, San Angelo, Texas, took into consideration increased efficiency in classroom instruction, defining classroom environment, how to make the building work for the teacher, and mechanical year-round air conditioning plus artificial lighting.

Heating, Ventilating and Air Conditioning Design Practice for Schools by Henry Wright, technical consultant, New York, N. Y., was primarily concerned with the problems, changing theories, and applications in planning for classroom cooling throughout the year.

Economics of School Heating and Air Conditioning by Z. A. Marsh, director of school activities, Minneapolis-Honeywell Regulator Co., covers figures indicating that air conditioning improves student efficiency, productivity and health.

State Board Problems—Financing and Others by C. B. Hershey, engineer, building services, Bureau of School Buildings, Department of Public Instruction, Commonwealth of Pennsylvania, will be concerned with such matters as local financing, state subsidy and procedures for applying for and obtaining such aid; also a description of the function of the Pennsylvania State Department of Public Instruction in school building programs.

Looking Into the Future by E. G. Good, senior partner, The Firm of Edmund George Good, Jr., Harrisburg, Pa., concluded this symposium.

Design and Features of Traps

Part 4 of this article describes and illustrates impulse, siphonic and metal expansion types of steam traps. It is the last part of series and covers trap design and outlets.

AN impulse trap, such as shown in Fig. 52, is designed to take advantage of the drop in pressure when water traverses a passage through two orifices in series. This pressure drop is utilized to open the trap valve. As this water or condensate becomes hotter and approaches steam temperature, some of it will flash to steam when flowing from the higher to the lower pressure. The flow characteristics of the flash steam differ from those of water. This increases pressure in the control chamber, thus closing the trap valves.

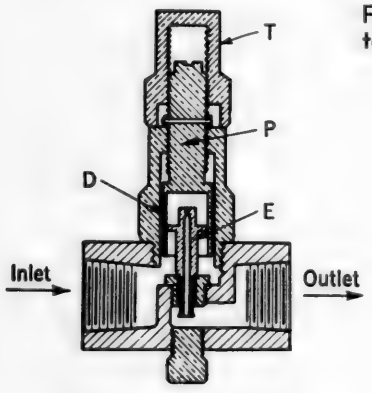


Fig. 52. Impulse trap to take advantage of pressure drops.

In Fig. 52, *D* is an adjustable guide or cylinder for the valve *E*. Details of this construction are shown in Fig. 53. Valve *E* is constructed with a thin piston disc *C* which moves up and down in the cylinder *D*. At the top of valve *E* there is a control orifice of rounded shape to provide streamlined flow. Guide or cylinder *D* is bored with a reverse taper (larger at the top) so that as the disc *C* rises higher, the annular space of the guide becomes greater.

The theory of operation is that when only cool condensate passes, the control orifice is able to handle the volume flowing past the piston disc. This results in a lowered pressure on the upper side of the disc and the valve rises permitting the water to pass through the seat. The higher the valve rises, the greater the flow past the disc due to the reverse taper of the cylinder. As a result, the valve arrives at a balancing point and in effect floats on the load.

As condensate gets hotter and nears steam temperature, a certain portion of it flashes to steam when it passes the valve disc into the control chamber and again when it flows out the control orifice. This results in increased pressure on top of valve disc and the valve snaps closed. This increased pressure is able to close the valve because the effective area of upper side of valve disc is greater than that of under side of disc resulting in a greater pressure in the downward direction.

When condensate is eliminated and the line is filled with steam, the valve is held closed by the downward force just described.

The impulse trap has come into wide use in industry for nearly all types of services. It should not normally be used on a vacuum return system, however, nor where the back pressure in the return line exceeds about 25% of the pressure at the trap inlet.

This trap can be used satisfactorily on high pressure steam. It requires no priming and, therefore, cannot lose its prime under superheat conditions. No bypass is required around this trap and it is non-freezing. The impulse flow results in almost complete drainage of the line when steam supply is shut off, so there is no danger of freezing during either operating or shutdown periods. As with all types of traps, a short length of pipe attached to the trap outlet will reduce the noise and flash of the discharge.

Impulse traps are factory set to operate up to full rated pressure without adjustment or change of valve and seat. No attempt should be made to change the setting in the field except for operating pressures under 20 psig, in which case the split washer should be removed from under the locknut and the control cylinder lowered as called for in the manufacturer's instructions.

This trap is unaffected by fluctuating pressures and pulsations in the line such as are frequently met with in industrial process applications. It will even withstand the severe pulsations encountered in steam hammer service. It has proved quite successful in marine service as it is not affected by vibration and water hammer caused by rolling of a ship, as possible with any type of trap which must be installed plumb or which operates by water level. Other advantages of the impulse trap are a trap easily maintained or replaced and light weight for support by the piping itself, without change of pipe direction. Obviously, the smaller the trap, the less heat it loses from the trap body, an important consideration with high pressure steam and where insulation of the small body is not likely.

When the amount of condensate is small, the discharge through the control orifice is continuous and the piston valve does not lift. At medium loads, the discharge is usually intermittent or pulsating, the main valve opening

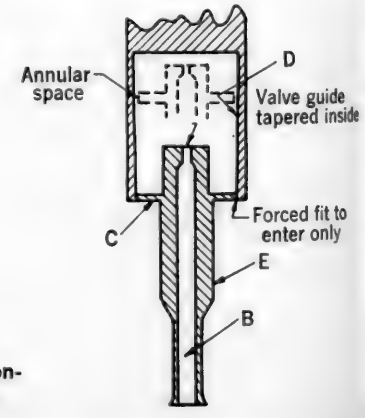


Fig. 53. Details of construction of guide.

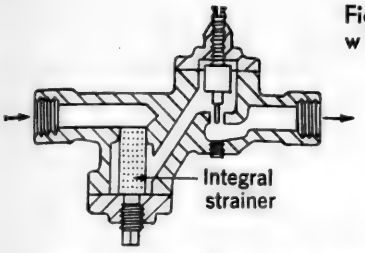


Fig. 54. Impulse trap with an integral strainer.

and closing at short intervals with light discharge between intervals. For heavy loads, the discharge is continuous, the main valve remaining open.

Only a few per cent of full trap capacity is required to seal the control orifice against the passage of live steam. As long as this amount is present, no measurable steam loss can occur.

Where the load is especially light and insufficient condensate is present to seal the control orifice, there will be some passage of live steam. The amount of steam loss will depend on how much the load is below that required to seal. For example, the standard ½ inch size of this trap requires less than 50 lb per hr of condensate to seal the control orifice.

To take care of very light loads such as are encountered on steam mains, steam tracing lines, small platens, and similar applications, one manufacturer of impulse traps has recently brought out a new model having half the condensate capacity and half the control flow of the standard ½ inch size.

It is now recognized good practice to install a strainer ahead of a steam trap. Normally, occasional blowing down of the strainer will keep a trap free of dirt and scale. Where excessive dirt and scale are present it is desirable to disassemble the trap at suitable intervals. In the case of the impulse trap, valve and control cylinder can be cleaned in a few minutes without removing trap from the line.

When desired, the impulse trap can be furnished with integral strainer as shown in Fig. 54.

In this combined unit, the standard design is altered to include a cylindrical baffle above the trap seat to prevent impingement of any high velocity condensate directly against the valve.

Siphonic Traps

The trap illustrated in Fig. 55 is interesting. While it is assumed to operate with a siphonic action, the water

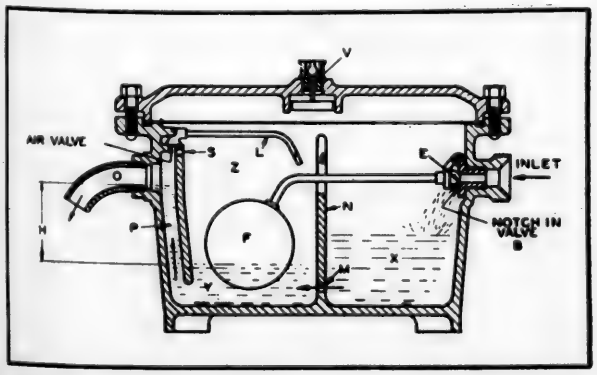


Fig. 55. Siphonic trap has control on the inlet.

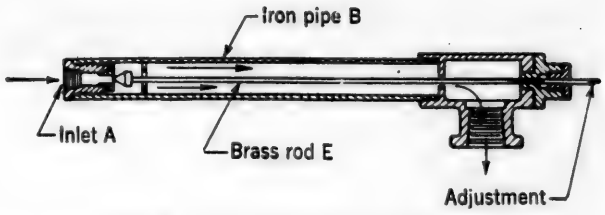


Fig. 56. Typical metal expansion trap.

level in the trap, which determines the amount of opening of the inlet valve *E*. is controlled by any slight change in pressure that accumulates in the body of the trap.

Condensate enters through the inlet valve *E* and passes from the chamber *X* to the chamber *Y* through an orifice *M* in the partition *N*. The partition *N* checks any surging of the water which might take place if the water is blown into the trap under high pressure.

The discharge channel is taken from the bottom of the trap and any slight pressure in the space *Z* will force the water up the passage *P*, through the outlet *O*; the distance *H* is equal to the excess pressure in the trap above that at the outlet.

As the water level falls in the chamber *Y*, it lowers the float *F* and closes the inlet valve so that no more water or steam can pass.

If the condensate temperature entering the trap is not above 212 deg, there will be no pressure in the trap and the water level will rise to the same level as the outlet, allowing the float to open the inlet valve wide. As soon as water above 212 deg enters the trap, re-evaporation takes place and a slight pressure is created in the space *Z*. This slight pressure will force some water out of the trap and lower the level until *H* equals the prevailing excess pressure. The trap will set itself to work steadily when the inlet valve is sufficiently open to allow any water at 212 deg or below to pass but will close if the temperature rises much above 212 deg.

When starting up and only cool condensate enters the trap, the float *F* will rise sufficiently high to lift the lever *L* thereby opening the air valve. This gives a free passage for air to pass through the trap from the machine or coil and allows quick heating up.

If the temperature of the condensate entering the trap is much above 212 deg and considerable re-evaporation takes place from the water entering the trap, then too much water will be forced out of the trap and the water level will fall sufficiently to close the inlet valve *E*, entirely, thus preventing any more water from entering the trap. Normally, the trap would remain closed until recharged with water, but it is customary to form a niche in the inlet valve head at *B* which allows a small trickle of water to pass and gradually fill the trap sufficiently to start it operating again. *V* is a relief valve which lifts at about 1 or 2 lb pressure so that no great pressure can accumulate in the trap body.

A siphonic trap is quite a departure from the usual, particularly so because the inlet valve is controlled instead of the usual outlet valve. The water level in the trap controls the opening of the inlet valve, providing slight changes in pressure do not affect the water level.

At high condensate temperature, pressure from re-evaporation in the trap may force condensate out of the second chamber, in which case prime is lost, the inlet

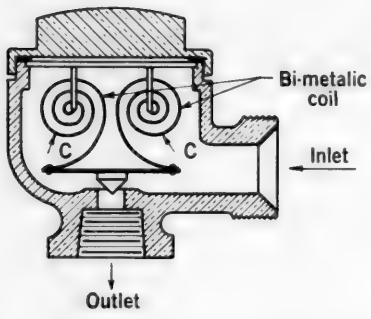


Fig. 57. Details of a bimetallic trap.

valves closes, and no more condensate can be received until prime is restored. Loss of prime is corrected by the flow through a slight cut in the inlet valve mentioned previously. Such a passage can be wasteful, especially as the passage wears.

Due to its action, this trap works best at low pressures. With no pressure in the trap, the water level within it will rise to outlet level, at which time the float will open the inlet valve wide. At high pressures, the trap may hold up condensate until it cools to 212 deg, although in some applications this could be desirable.

Metal Expansion or Bimetallic Traps

These traps rely on the difference of the coefficient of expansion of two dissimilar metals. A typical metal expansion trap is shown in Fig. 56, and a bimetallic trap in Fig. 57.

When the condensate passes in at the inlet valve *A* of Fig. 56, and travels over the metal rod *E*, it is the greater expansion of the rod *E* as related to the body *B* which causes the trap to function. Usually the body *B* is constructed of iron and the rod *E* is brass. It is the differential expansion of the brass and iron that causes the trap to close when the condensate passing through the trap reaches the correct temperature.

There is usually an adjustment at the end whereby the rod *E* can be moved inwards or outwards so that the valve can be closed at lower or higher temperatures.

These traps are obtainable in lengths from 9 to 40 inches and are used for horizontal installation only. The longer the trap and the higher the temperature, the greater is the expansion.

Metal can become fatigued in time, power from expansion is small, and the expansion of metal is not flexible enough to meet varying loads, as with a hermetically sealed liquid. This trap, however, can be of the thermostatic type when fitted with a bellows element, Fig. 58, in which event the trap can be installed either horizontally or vertically (with outlet down).

Because of the efficiency obtainable when discharging condensate at low temperature, this trap is widely used

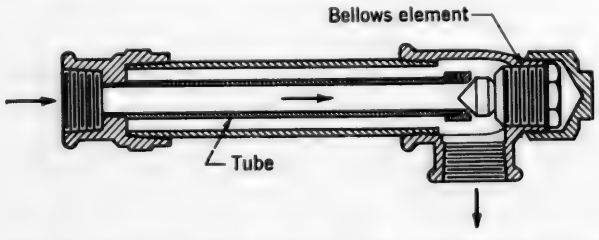
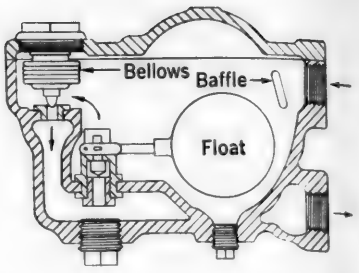


Fig. 58. Thermostatic type trap with a bellows element.

Fig. 59. Baffle for side inlet to trap.



for draining factory heating coils, large outside tanks, and in many places where the condensate has to be thrown away and cannot be returned to the boiler. It is particularly useful as a low cost trap for emergency use when installed as a spare alongside of some other trap or when arranged to drain a bucket trap in freezing weather.

Baffling the Trap

Locating the inlet on a trap for least disturbance of float or bucket by condensate flow is another ideal to be obtained, one that is accomplished by the use of baffles or some other method necessary to the physical arrangement or design of the particular trap. Various methods of baffling the side inlet in different makes and types of traps are shown in Figs. 59 and 60. When, however, a side inlet trap has its flow directed to the bottom of the trap, Fig. 60, or a float is farther removed from the inlet, a baffle may still be used, although less essential in such cases. Some baffles also serve to reduce the amount of dirt entering an upright bucket.

A bottom inlet may help to keep dirt in suspension, but it usually requires a baffle or some equivalent means to direct inlet flow away from the bucket. Integral strainers and inlet pipes also help in this respect and some serve also as guide post for the bucket. The manufacturer of an integral bottom inlet strainer says the strainer can be cleaned while the trap is operating.

Trap Outlets for Flexible Use

Although the required arrangement of piping to suit the trap selected is of some importance as a factor of cost, greatest savings and convenience are obtained where there are many traps, as in a large plant. Savings by the use of minimum piping then become much greater than commonly realized. Still further savings are made by reduction of maintenance, leakage, thermal losses, and insulation requirements. Appearance is bettered, cleanliness made easier, and space conserved.

Accordingly, bucket traps may be obtained with inlets and outlets at most any conceivable elevation and loca-

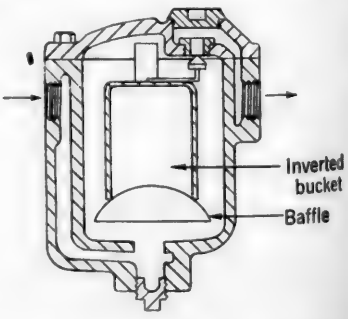


Fig. 60. Baffle placed at bottom of trap.

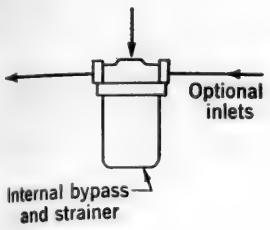
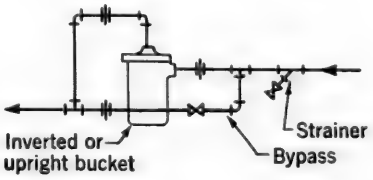


Fig. 61. Arrangement for trap with built-in strainer and bypass.

tion on their body, and often the trap comes with additional or alternative openings to suit various conditions which may arise. The inverted bucket trap is most flexible in piping possibilities, but the upright bucket, due to its construction, has but few alternatives.

The straight through connections at top or bottom of the trap simplify the piping and allow the return line with top connections to be kept well clear of the floor and save on head room, or with bottom connections, close to the floor as desired. With the straight through arrangement and a trap with strainer and bypass built-in, Fig. 61, all the nipples, unions, valves, fittings and insulation shown in Fig. 62 are avoided, together with any piping that might be required to form a water seal. However, with the external bypass, the trap could be closed off and repaired with the plant operating.

Fig. 62. Piping arrangement where trap does not have built-in features of Fig. 61.



It is interesting to refer to Fig. 63 and note that the inverted bucket *A* when inverted as in *B*, would close the discharge valve by weight of water filling the bucket, if not by virtue of bucket weight. Nor could the vent hole lose water once the bucket overflowed. In the case of the upright bucket *D*, when inverted as in *E*, the weight of the bucket would keep the discharge valve closed, except when briefly buoyed by steam or air upon initial operation.

Trap Design

Generally speaking, the more simply a trap is constructed, the more accessible it is for cleaning, the less liable it is to give trouble due to dirty and oily steam. Although strainers and dirt pockets give valuable protection to traps, it is only natural for traps to collect some dirt since they are usually installed at low points. That is why certain types of traps have one or more cleanout plugs. When they do not have them, it is probably because the traps are of a type or design which is more or less self cleaning, or can be conveniently cleaned through covers or pipe connections. Sometimes a trap is of a design not readily so adaptable.

Much of trap design is a compromise between minimum and maximum loads and various other conditions. Air vent ports, if made large for initial venting of the system, may pass some steam under normal working conditions. This is particularly the case with the inverted bucket trap where too large a vent hole in the top of the bucket passes steam before it can be con-

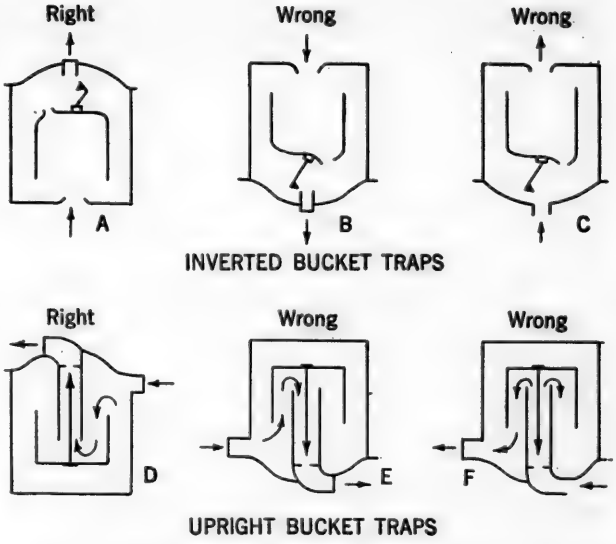


Fig. 63. Right and wrong designs for inverted and upright bucket traps.

densed within the bucket. On the other hand, if the hole is made too small it may retain too much air too long. The inverted bucket trap should be designed for minimum wear with simple linkage and as few threads to cross and strip as possible. Gaskets, pins, special tools and all working parts should be reduced to a minimum, while seats should be of some material highly resistant to wire drawing.

A thermostatic trap may be designed with a bellows of large diameter to give the trap greater power and a larger seat and capacity in relation to its pipe size. If so, it must also be designed with greater resilience, otherwise the capacity remains about as before. Increase the flexibility of the bellows by increasing its diameter and the greater becomes the drop in condensate temperature or temperature differential required to lift the valve off its seat. The trap may then become too sluggish in operation and may not respond to small changes in temperature. Another point is that the more power a thermostatic trap has, the more care is needed to prevent distortion of its element, if removed from the trap body while hot. Service men, as a rule, first cool the trap itself with water to prevent such distortion. One manufacture says this is not necessary with his trap.

The flexibility of a bellows is directly proportional to the number of convolutions in a given length, materials and wall thickness remaining the same. Doubling the number of convolutions doubles the flexibility and halves the spring rate. While this may be done when space is limited, the simpler process is to use a larger bellows. However, the length to diameter ratio should not be much greater than one to one to avoid buckling in service. This tendency can be alleviated to some extent by using an internal or external guide. The smaller the diameter, the less the flexibility and the smaller the deflection with a given load. Flexibility in terms of stroke per unit load varies directly as the square of the outside diameter of the bellows. The stiffness of a small bellows may therefore require that the length be increased to one and a half or even twice the diameter to obtain the desired length of travel.

LOUIS BLENDERMANN ON

PIPING AND PLUMBING

Noise Transmission in Piping Systems

WHEN designing a water distribution system for a new building, it is of equal importance to design a system in which noise transmission had been reduced to a minimum, as it is to design a system that is adequate for the water demand of the building. When a system is noisy, the sound can be heard in many parts of the building. In fact, copper piping filled with water is an excellent medium for transmitting sound. Any piping noise generated in one portion of the building is easily conveyed to other parts of the building. Sometimes these noises even seem to be magnified by the piping system. It is the responsibility of the engineer to determine just where piping noises will most likely develop and then exercise every consideration in his design and specifications to prevent their occurrence. It is equally important for the contractor to install the component parts of the piping system with due regard for those sections in the piping distribution system where noises are prone to develop.

Basic Causes of Noise Transmission

There are 5 basic causes of noise transmission in a water piping system and they can be listed as follows:

1. Fixtures and equipment.
2. Water hammer.
3. Excessive pressures.
4. Undersized piping.
5. Piping supports.

While there are a number of other factors that contribute to noises in a piping system, the ones listed are the major contributors. Each of the items listed will be discussed as to cause, as well as preventative measures that can be taken to avoid or minimize their effects.

Fixtures and Equipment

When a water closet is flushed it creates a noise that is quite audible. Some water closets when operated, produce more noise than others. Often the noise is generated by the particular arrangement of the jets in the closet bowl. Again, it may be caused by the type of ball cock used in the tank closet combination. When flush valves are employed, a noisy flush generally indicates that some adjustment must be made to the flush valve or that the diaphragm strainer must be cleared of the debris it has accumulated. One way of assuring a quiet operating water closet is to specify a siphon jet unit instead of the blow-out type. Where a tank closet combination is used, it is important that the water supply to the tank be adjusted by the control valve to a degree that is most quiet in filling the tank. The float in a tank combination should be positioned properly to prevent its rubbing against the side or wall of the tank. When flush valves are used, they should be properly adjusted to furnish an adequate amount of water and to operate quietly. Similar considerations hold true for the flush valves used with urinals.

With sinks, lavatories and bath tubs, a loose faucet washer can be responsible for creating a chatter in the piping system. It occurs in the following manner. As the faucet is opened and the water starts to flow, the washer will vibrate between the faucet stem and washer seat. The noise generated by the vibration is a loud one and is generally transmitted through a large portion of the piping system. Actually, this condition sets up a shock wave in the piping system known as water hammer. The fault is easily corrected by using a screw driver to secure the washer in place.

If the faucet spindle is warped or bent, a squeal will develop when the faucet is opened to a certain degree. It occurs when the flow of water reaches a certain velocity which causes the spindle to rub or vibrate against the side of the faucet shank and thus emit a squeal. This condition is especially noticeable in hot water faucets where the heat of the water aggravates the occurrence. The solution here is to replace the faucet stem or spindle and if necessary to replace the faucet or faucet combination.

Check Valves. These can create a noisy condition in the piping system. As the flapper in the check valve slams to a closed position, it can be heard throughout the piping system. It is rather difficult to pin point a solution here because each situation has a different cause and all factors must be explored before the corrective measure can be determined. A water hammer arrestor is often an effective remedy. Otherwise, a check valve with a soft seat, or a spring loaded check valve might be considered as a way to cure the difficulty.

Gate Valves. Loose fitting wedges in gate valves can often create noises in the piping system. When the valve is in the open or partially open position, the surge of water will cause the wedge to vibrate and thus transmit noises. A solution here is to specify good quality valves thereby avoiding this annoyance. If this type noise prevails in an existing system, it is rather difficult to locate. To find the noisy valve, it often becomes necessary to shut off parts of the piping system until you have located the section of piping where this noise seems to be originating. Once the faulty valve is discovered, it must be either adjusted to prevent the vibration or must be replaced.

Globe Valves. A globe valve can create noises when a loose washer vibrates with the surge of the water passing through the piping. Here again, the faulty valve must be located and its washer tightened.

Solenoid Valves. This type valve can set up severe noise conditions. This condition will be discussed under water hammer.

Equipment. Any type of equipment that vibrates or throbs can transmit its sounds to the water distribution system unless the equipment is properly isolated to avoid direct connections with the piping. An example is house pumps. Each time the pump starts up a considerable vibration takes place. If the water piping is directly connected to the pump it will also vibrate. Flexible connections placed at the inlet and outlet connections of the pump will prevent the pump vibration and noises from being transmitted to the piping. The occurrence of cavitation at the discharge side of the pump can also be prevented to some extent by flexible connections. A water hammer arrestor in this instance will be of great value in reducing the noise associated with cavitation. The use of vibration dampers at the base of the pump will eliminate much of the noise and vibration generated by the operation of the pump.

The same type of consideration must be extended to all other equipment that can project its noises directly to the piping system.

Water Hammer

One of the most common cases of noise transmission in the piping system is the phenomenon of water hammer. There are a number of factors that can set up conditions for water hammer but the basic cause is quick closing valves and faucets. When water hammer occurs, it is signified by a loud banging, pounding or rattling of the piping in which the shock wave is taking place. Because the piping system is a good conductor of sound, the noise can be heard in many parts of the building.

In addition to this being very annoying, water hammer can be extremely damaging to the piping. It may rupture the piping or cause pipe connections to leak. Water hammer arrestors are the best means to rectify or reduce the effects of water hammer. The water hammer arrestors should be placed at locations where the water shock is most likely to originate.

Excessive Pressures

When the water pressure is excessive in a building, it will make a certain amount of noise in its passage through the piping system. As a faucet is opened, one can hear the water passing through the piping. The rush of the water in the piping is especially noticeable in small diameter piping. Water hammer is more likely to occur when water pressures are excessive. Excessive water pressures will also cause the piping to creak and strain. This condition is particularly noticeable where offsets in the piping are involved. Moreover, excessive pressures place a severe strain on piping connections and therefore should be avoided. If the excessive pressures are not controlled in a building, a noisy system will result. There are two methods which may be used with a good deal of success in controlling the pressures.

One method requires the throttling of certain main valves, riser valves and fixture or equipment valves wherever the system seems to be most affected by the excessive pressure.

The other method requires the installation of pressure reducing valves. One pressure reducing valve can be placed on the water service line as it enters the building. If the building is rather large or spread out, it may be necessary to partially control the pressure at the water service line and then install individual pressure regulators at prescribed locations in the building to control the pressure in sections of the piping. These methods will supply the water quantities needed at specific pressures, and will eliminate situations that could cause noise and damage in the piping distribution system.

Undersized Piping

A system that is undersized, or contains sections of undersized piping, will react in a manner that is similar to a system containing excessive pressures. In fact, even the sounds created by this type of system will be similar.

In this case it is the rush of the water passing through the piping to fulfill the demand of the fixtures, that creates the trouble. The only positive solution in this type of a situation is to design a piping system that is adequate for the building demand.

If the building is an existing one and the problem is that of undersized piping, it becomes necessary to determine which sections of the piping seems to be the noisiest and to replace these sections with larger diameter piping. In many cases, corrosion will reduce the inside diameter of the piping to an extent that it may be regarded as undersized. When this situation prevails, it might be timely to check the condition of the piping in various part of the system to determine the extent of corrosion that has taken place. If the piping is sufficiently corroded it may be advisable to replace these sections of piping and at the same time, utilize a larger diameter piping that is more suitable for the needs of the building.

Piping Supports

Improper piping supports are often the factor that is responsible for a noisy piping system. This includes the supports used for the main piping runs as well as the supports used with the vertical piping risers or the horizontal branch piping.

For main piping runs in the basement or cellar of a building, it is necessary that the piping not only be adequately supported but also that provision be made for the expansion and movement of the piping. These mains will move due to the action of expansion and water pressure. To reduce the noise factor, it is imperative that expansion devices be installed in the lines at proper locations to control the movement of the piping and confine its action to predetermined limits.

Where long runs of piping are involved, it is good practice to use roller supports on which the piping will rest. The roller supports will prevent the pipe from rubbing against or moving the trapeze hangers.

The piping mains should be so designed and installed, that they do not come in contact with another section of the piping. Moreover, different systems of piping should not be installed so that one line might rest on another.

(Concluded on page 140)

PRODUCT APPLICATIONS

New, Unusual, or Ingenious Uses of Equipment and Materials

Underfloor Heating Distribution Obviates Pipe Tunnels

A unique underfloor heating distribution plan was used to eliminate costly pipe tunnels at the million dollar classroom building and dormitory for St. Scholastica Academy, Ft. Smith, Ark.

Wrought iron pipe, ranging in size to 6 inches, was installed to carry hot water to convectors and unit ventila-

tors. The piping was positioned in trenches near point of use and encased with Gilsonite granular insulating material which helps minimize heat loss. The concrete floor was then poured over the entire installation. The insulating material is melted by heat from hot water passing through the piping to form a water-resisting coating.

A total of 18 tons of Byers-produced wrought iron was specified for this modern hot water heating system, as well as steam condensate and pump discharge lines. Haralson and Mott, Fort Smith, are the architects. Pettit & Pettit, of Little Rock, Arkansas, did the engineering.

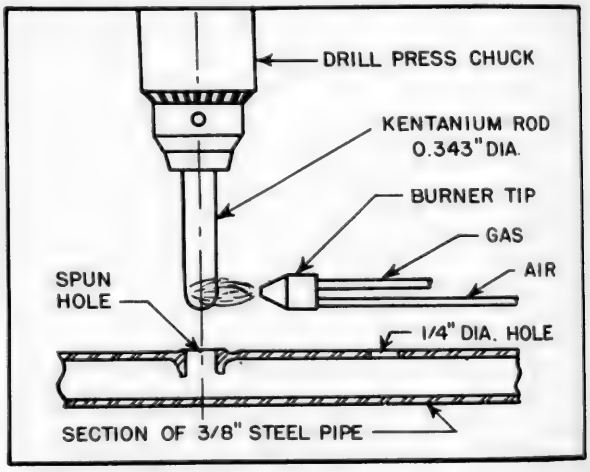
Commission Offers Restroom Facilities For Tired Turnpike Truckers

Sixteen service plazas are distributed along the 241-mile Ohio Turnpike. Each plaza has special restroom facilities for truck drivers to help them relax and maintain alertness for safe driving.

From 100 to 150 drivers use each plaza daily, and about 10% of them use shower facilities. When the Turnpike was completely opened in 1955, hot and cold hand valves were installed on showers. However, according to Ohio Turnpike Commission, these valves were recently replaced by Hydroguard controls, made by Powers Regulator Co., to give drivers a more comfortable shower and to safeguard against possible scalds.

Spinning Operation Thickens Thin-Walled Pipe To Required Tapping Depth

A problem in threading of holes in the 1/16-inch thick wall of $\frac{3}{8}$-inch pipe for $\frac{1}{8}$-inch pipe fittings in a manner that would pass a gas appliance code pressure test was a project taken on recently by Mission Appliance Corporation, Hawthorne, Calif. Since use of the thin-walled pipe reduced costs considerably as compared with heavier pipe, there was a strong incentive to find a way to use the thin-walled pipe in gas manifolds for water heaters. Solution of the problem required thickening the wall around the hole to enable cutting more threads.



A solution was found in spinning smaller holes to tapping size and thickness with a titanium carbide rod. A Kentanium rod (Grade K151A) made by Kennametal Inc., Latrobe, Pa., was selected because the operation requires high abrasion resistance at high temperature. These conditions also require resistance to oxidation and thermal shock while retaining high strength at operating temperatures.

Operation, as illustrated, consisted of a rod, 0.343-inch dia and $3\frac{1}{4}$ inches long with ball nose ground on the end, flame heated to about 1200 deg F and turned at 2000 rpm in a drill press while being forced into $\frac{1}{4}$-inch punched holes in the pipe. In this operation the rod temperature reaches white heat, approximately 2000 deg. The metal around the hole is thickened to $\frac{1}{4}$ inch as it is pushed inward by the ball end of the rod.

Approximately 3000 holes can be spun before regrinding. This contrasts with about 100 holes per regrind for cast alloy steel tools which were tried first.

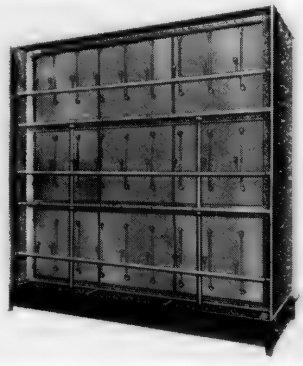
NEWS OF EQUIPMENT AND MATERIALS

Use the convenient prepaid postcard appearing on the last page for securing further information on new equipment and materials described in this department.

Sprayed Coil Dehumidifiers

A line of sprayed coil dehumidifiers for built-up comfort and process cooling systems, is announced by The Trane Co., La Crosse, Wis. Units are said to be especially adaptable for applications requiring precision humidity control.

Typical applications are in systems servicing hospital operating areas and delivery rooms, textile mills, printing plants, food processing concerns and film processing



firms. Another use is in induced air systems for dehumidification of primary air supply.

Basic components are: a bank of coils; spray nozzle assembly; heavy gage eliminators; and a rugged, corrosion-resistant, vertical casing.

Two space-saving models in 36 sizes are available—one model with coil sections mounted together and secured by one-piece side panels, and the other with sectionalized side supports for simple removal when coil inspection is desired. Capacities range from 2,500 to 41,000 cfm.

Heart of the dehumidifier is the company's Delta-Flo fin coil which provides high heat transfer.

More information? Circle Item 1, postcard, last page.

Heavy Duty Submersible Pumps

A line of 6-inch dia submersible pumps has been put into production by The F. E. Myers & Bro. Co., Ashland, Ohio. The heavy duty submersible units are particularly suitable for deep well installations where large volumes of water are needed. The pump can be installed in wells as deep as 700 ft. The line's top capacity at a 50-ft depth is over 13,000 gph.

Called the SC submersible pump, units are available for providing primary water supply for industrial plants, cities, large farms, and groups of suburban homes; as a pressure system for schools, dairies, hospitals, motels, and other commercial buildings; as a booster system for increasing pressure in city water lines; and as an irrigation pump.

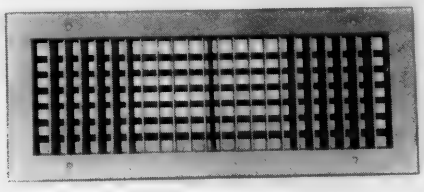
The model operates completely under water and is a combined pump and motor unit. The 60-cycle motor is oil lubricated, sealed, and drives the pump through a rigid coupling. Power is supplied to the submerged motor by a waterproof cable that is attached to the riser column pile. The pump is available in 5, 7½, 10 and 15 hp sizes.

Pump unit is a multi-stage centrifugal turbine pump and is made in either flat pancake stages for lower capacities at high head, or a turbine bowl type construction for higher capacities at lower heads.

More information? Circle Item 2, postcard, last page.

New Louver Arrangement

A new style of louver placement in grilles and registers for heating and air-conditioning is available from Waterloo Register Co., Inc., Waterloo, Iowa. The extruded



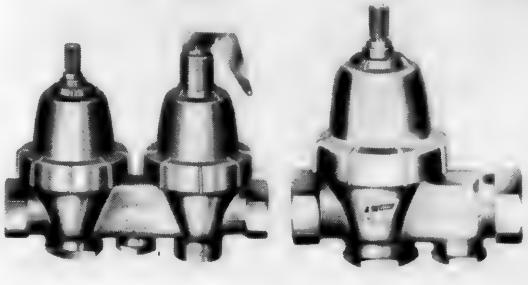
aluminum louvers are adjustable, and are placed with the broad edge pivoted at the front of the grille. With any angle of setting of the louvers, the appearance of the grille or register is not changed.

More information? Circle Item 3, postcard, last page.

Units Have Built-In Check Valve

Available from Taco Heaters, Inc., Cranston, R. I., is a line of low cost bronze dual controls (at left in photo) and reducing valves (at right) with built-in check valves.

The dual unit is furnished in ½-inch size only; re-



ducing valves are available in ½- and ¾-inch sizes.

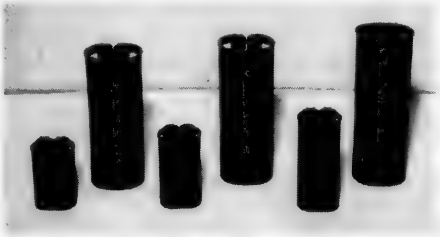
Features of units include large strainer areas, stainless steel compensating springs, non-sticking high-temperature seat discs, and reinforced diaphragms.

More information? Circle Item 4, postcard, last page.

New Capacitor Case Design

Capacitors for compressor motors of air conditioners, offered by General Electric Co., Schenectady, N. Y., are now of higher capacity per unit.

Units—taller but with same base dimensions—offer three oval ratings in heights of 7, 7½, and 8 inches. The 7-inch unit, rated 20 uf, 370 vac, and the 7½-inch unit, rated 30 uf, 236 vac, have applications with compressor motors of room air conditioners. The 8-inch unit is



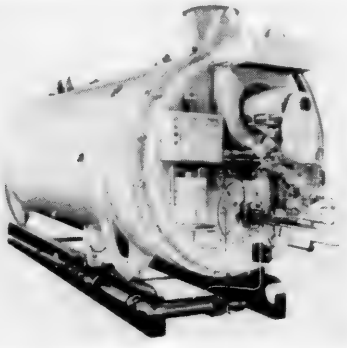
rated 20 uf, 440 vac, and may be used in multiple for central air conditioning applications. Typical application for the 7-inch unit would be 1 hp, 115 vac, 12 amps. The compressor used with the 7½-inch oval would be rated 1 hp, 115 vac, 7.5 amps.

Base dimensions for the three units remain 2¼ by 2-15/16 inch. Base dimensions of a newly designed 150-volt line are 1-15/16 by 2-27/32 inch. Popular ratings from 7-15 uf at this new voltage level are supplied in case heights up to 4¾ inches max. Units are used for low amperage fan motors of air conditioners. They are built in minimum-sized cases so as to be interchangeable with higher voltage fan capacitors used in the past.

More information? Circle Item 5, postcard, last page.

Packaged Boiler Line

Added by Cleaver-Brooks Co., Milwaukee, Wis., to its Series CB line of packaged boilers are 250, 300, and 350-hp sizes. This expansion brings the boiler line to 15 sizes, 45 models.



Developments incorporated in the new sizes are cited by the company as: (1) an inspirating pilot which establishes pilot flame with no gas pressure; (2) a single tip retractable nozzle that efficiently mixes air and oil, and is removable for quick cleaning; and (3) a rotary air damper which provides positive air modulation without rumble or vibration.

The boilers utilize forced draft, four-pass construction which, the company states, assures 80% efficiency from 30% to 100% of full rating in addition to quick response to fluctuating loads.

More information? Circle Item 6, postcard, last page.

Prefabricated Tubular Assemblies

To meet the demand for prefabricated tubular assemblies in air conditioning and heating equipment, Trenton Pipe Nipple Co., Trenton, N. J., announces the formation of Trenton Tubular Products Division.

Operations include cutting, bending, brazing and flaring, and assembling these items with various fittings. All items meet AGA standards, and are supplied plated or unplated. The parent company has been engaged for many years in supplying pipe nipples, brass, copper, PVC and aluminum nipples, both in standard sizes and to customer specifications.

More information? Circle Item 7, postcard, last page.

Flexible Gas-Vent Elbow

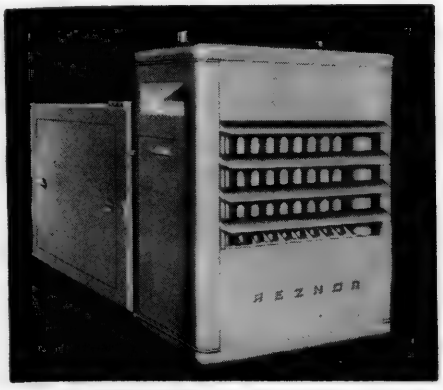
A flexible elbow for Type B gas-venting systems is offered by Dura-Vent Corp., Louisville, Ky. This one, double-wall, air-insulated elbow turns from zero to 90 deg with ease, the company states.

A continuous insulating air space between the inner and outer walls is not interrupted at either joint when any or all of the three sections are rotated. Also, joints will not bind, yet will not shift with respect to each other as a result of vibration from traffic or motor drives in the building. Internal flexibility permits horizontal or sloping runs without stress concentration. Smooth interior guarantees minimum draft loss.

More information? Circle Item 8, postcard, last page.

Enclosed Blower Unit Heater

Series BE enclosed blower-type gas unit heaters, produced by Reznor Mfg. Co., Mercer, Pa., boast exceptionally quiet operation and improved appearance, making them particularly suitable for libraries, churches, hospitals, and banks, the company states.



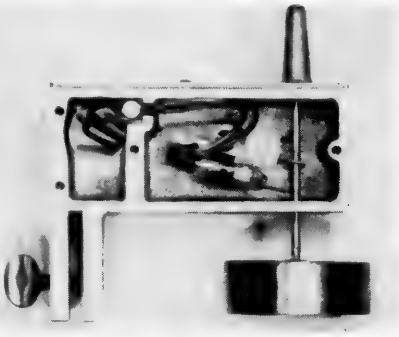
Blower and all controls are completely enclosed. All controls and connections are arranged in a convenient group and are easily accessible through a snap-out panel on the side of the heater. The unit is shipped completely assembled and ready for installation.

All heaters in the series are equipped, and AGA approved, for operation in duct systems with external static pressures up to 0.3 inches. Thus the unit may be used for applications where one heater heats several small rooms, such as the office and rest rooms in a service station.

More information? Circle Item 9, postcard, last page.

Condensate Removal Trio

Model C21-F sump type condensate removal pump for air conditioning and refrigeration equipment, Model FS float switch (illustrated) which turns all its cycling type pumps into automatic float-controlled pumps, and Model CV 1/8 check valve, which prevents all back drainage in discharge lines of condensate removal pumps, are announced by March Mfg. Co., Inc., Skokie, Ill.



Pump—Unit features new mounting possibilities: either inside the air conditioner case and off the unit floor, to relieve the crowding of compressor, condenser, and receiver; or outside the air conditioner case but off the room floor, hung on the side of the unit with detachable bracket, all connections in the back; or the pump may be mounted on a wall closely adjoining the air conditioning unit.

Pump has an effective lift of 21 ft which can be increased to 24 ft with pan-type mounting. Sump and cover are aluminum. Capacities are 1 and 2 gal. Safety switch cuts off entire air conditioning system in the event of power shortage to pump.

Float Switch—Clamping on edge of drip pan or on the pump itself, unit is of all-aluminum construction with waterproof mercury switch and copper float. Included is conduit box for three splices necessary to turn cycling pump into an automatic unit.

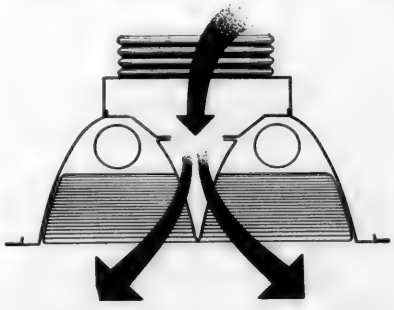
Check Valve—Since lifts up to 24 ft and horizontal runs to 300 ft are encountered in the field, company says, back drainage can involve considerable water, sufficient to overflow drip pan or cause short cycling of a condensate pump. Unit screws into discharge opening of pump and ahead of entire discharge line system. Its nylon ball loading is said to increase service life 3 or 4 times over that of conventional metal ball types. Its use will eliminate the guess work in sloping of lines properly to prevent back drainage.

More information? Circle Item 10, postcard, last page.

Air-and-Light Diffuser

An integration of air diffusion and fluorescent illumination into one functional architectural element is announced by Air Distribution Div., Barber-Colman Co., Rockford, Ill., and Day-Brite Lighting, Inc., St. Louis, Mo.

Developed jointly by the two companies, this unit, called the Paraflo troffer, can be readily installed in any suspended ceiling to provide high-comfort light and air



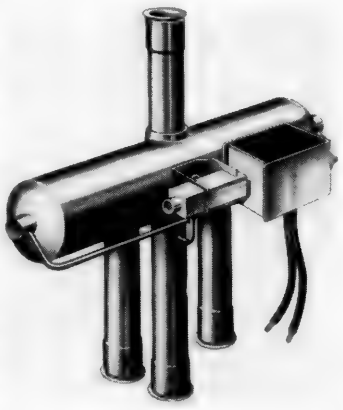
conditioning. Conditioned air is quietly and evenly diffused throughout the length of a center parabolic louver of perforated metal. The total free area of perforations provide low pressure drop and a correspondingly low noise level. The center V-arrangement, as pictured, imparts laterial deflection to the air stream resulting in spread type diffusion.

Laboratory velocity and temperature traverses show that the units can deliver up to 150 cfm at normal temperature differentials. Conditioned air mixes quickly with room air to provide uniformity and comfort within the occupied zone of the room. Moreover, the divergence of the air stream is such that it does not contact the ceiling; therefore ceiling surfaces are not subject to unsightly smudging, companies state.

More information? Circle Item 11, postcard, last page.

Heat Pump Reversing Valves

Models V25 and V26 slide-type reversing valves, with features making them extremely applicable for heat-pump control, are announced by Ranco, Inc., Columbus, Ohio. These features are:



An absence of metal-to-metal contact to minimize wear due to dirt and corrosion; a nylon transfer slide to reduce friction and act as a thermal insulator between the hot and cold to minimize heat exchange; and pressure differential operation to eliminate stops in mid-stroke. Further, valves are designed to operate under full pressure and provide immediate transfer no matter how fast the changeover through the heating, cooling, and de-icing phases of heat-pump operation.

There are 5 models with Refrigerant-22 capacities through 7½ tons. Solenoids are available in 24, 115, 208, 230 volts a-c, and 12 volts d-c.

More information? Circle Item 12, postcard, last page.

Under-Dash Car Conditioner

The 1958 Frigiking Model 58-UD under-dash car air conditioner features high-capacity cooling for owners of 59 different makes and models of automobiles, 1952 to 1958 inclusive, according to Frigikar Corporation, Dallas, Tex.

Other improvements include contemporary case styling that gives the appearance of being part of the car, not an accessory. The unit starts cooling instantly, changing air every 30 seconds in the average car. It can be dealer-installed in less than four hours in the average passenger car, station wagon, or convertible.

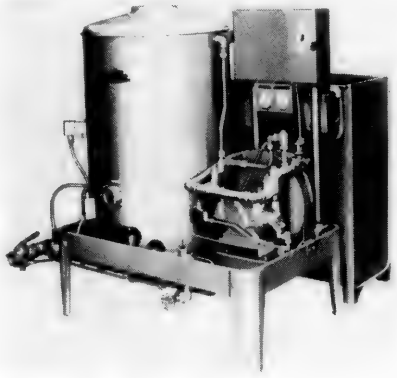
Increased cooling capacity was demonstrated, states the company, by pre-season tests with station wagons on New Mexico, Arizona, and California desert runs. The unit dropped 110-deg in-wagon temperatures to the low 70's in minutes, maintaining this cooling level for hours. Since station wagons (having two to three times more air space than passenger cars) have posed the most serious cooling problem to car air conditioning manufacturers, these tests are claimed to provide evidence of the conditioner's capacity for cooling all cars under severest conditions.

The unit's all-metal, fully-insulated case fits two inches further under the dash for improved appearance and greater leg room. Other mechanical changes include a 6-bladed fan replacing earlier 4-bladed unit, increased air movement, and a unitized receiver-dryer-sightglass assembly.

More information? Circle Item 13, postcard, last page.

Heavy-Duty Steam Cleaner

The 280 Blast-Master is a heavy-duty steam cleaner available from Clayton Mfg. Co., El Monte, Calif. It will deliver all or any part of 280 gal per hr of balanced cleaning solution.



Self contained, the fully automatic unit is designed for fleet operators, heavy equipment distributors, contractors, industrial plants and others. An accurately controlled vapor is delivered at a distance of 3 ft. or more through cleaning gun.

More information? Circle Item 14, postcard, last page.

67-lb Window Unit

A 67-lb portable air conditioner is announced by Fedders-Quigan Corp., Maspeth, N. Y. With a ½-hp, 7½ ampere compressor, it develops 4600 Btu per hr. Called Minute Mount, Model 86-M2, it is aimed at the consumer who will want an air conditioner for immediate use during a summer heat wave.

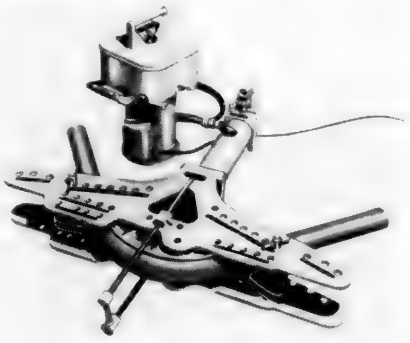
The unit boasts a Safety-Fast mounting system, which is said to do away with installation kits and make it possible to completely install a unit within a few minutes of bringing it into the house. A steel plate is first placed on the window sill and held firm with brackets. The unit then slides onto the plate, automatically positioning itself in the window line. Telescoping side panels and sealing gasket assure a weather-proof and safe installation, company states.

Height and depth of the unit are 12½ inches. It is 20 inches wide.

More information? Circle Item 15, postcard, last page.

Hydraulic Motor Pump

Tal Bending Equipment, Inc., Milwaukee, Wis., announces the development of a small, fast, powerful, and portable hydraulic motor pump developing up to 10,000 psi pressure and weighing only 65 lb.



Besides being used with the company's hydraulic pipe benders, as illustrated, or any other make of hydraulic benders, pipe pushers, knock-out punches, and hydraulic jacks of any kind, it can readily be installed and adapted to give fast continuous power wherever hydraulic power is used or can be used to replace mechanical power.

The pump, Model MP-27, is rated for 10,000 psi intermittent and 5000 psi continuous duty delivering 80 cu in. of oil per min, and is driven by a standard ½ hp single phase, 60 cycle, 1750 rpm 110-220 volt motor.

More information? Circle Item 16, postcard, last page.

Electronic Air Cleaners

A line of electronic air cleaners, known as AC/ME (advanced capacity-maximum efficiency), is introduced by Minneapolis-Honeywell Regulator Co., Minneapolis, Minn. Units are ⅓ smaller and 30% less expensive. At the same time the company announced that it has begun manufacture of activated charcoal filters for installation in air conditioning fan systems to remove all odors from the air.

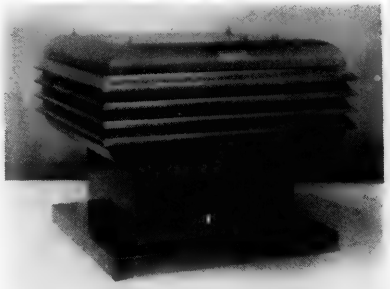
A combination of the electronic air cleaner and the charcoal filter will provide very economical air conditioning systems providing a high level of air purity and cleanliness. Installation of the combination permits a reduction of approximately 25% in the amount of outside air needed in an air conditioning system, the company states. For every 1,000 cfm of summer air that is eliminated from the system, there is an approximate savings of 634 dollars, the company estimates. The air cleaner prolongs the life of the charcoal filter by preventing dust from entering it.

The air cleaner is available in 4 models. Heart of the new design is a cell that employs a new voltage gradient in the plate section. Plate spacing is reduced so that a 10,000-cfm unit requires only 20 sq ft.

More information? Circle Item 17, postcard, last page.

Power Roof Exhauster

A high capacity power roof exhauster, designed for the 300 through 27,000 cfm range, is the Wausau air mover, announced by Greenheck Fan & Ventilator Corp., Schofield, Wis.



Base curb rings are made of steel; louver fins are of aluminum for lifetime service, the company states. Sealed ball bearings are used to mount the non-overloading backward curved wheel. Motor is located out of air stream, and is adjustable to control pulley belt tension. Vibration mountings isolate both fan and motor from base, providing quiet, smooth operation.

More information? Circle Item 18, postcard, last page.

Systematic Package Installation

Development of a master plan for the systematic installation of packaged air conditioning in multi-story buildings is announced by Carrier Corporation, Syracuse, N. Y. The plan, Multi-Weathermaker System, coordinates installation of the company's individual Weathermakers and avoids haphazard equipment placement.

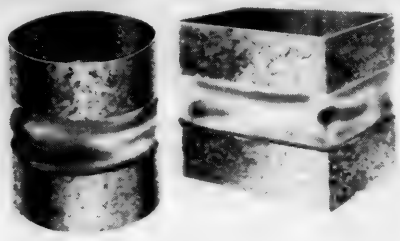
This plan has been developed, asserts the company, to enable building owners to allow for the air conditioning of their properties without a large initial cash outlay. The heart of the system—a utility core consisting of cooling tower, electrical service and water supply—is installed first. Then individual units are placed according to a master plan, perhaps over a period of several years. Air conditioning may be included in the lease, on an optional basis, at an increase in rentals. This, company states, will result in more revenue per square foot of space to the owner.

Among the features of the system are a relatively low first cost, and ease and reduced costs of installation since equipment can be brought to its site by elevator rather than by expensive rigging. Operating costs are similarly reduced because each unit is turned on only when needed, and operating engineers are not required since individual controls are located in each office.

More information? Circle Item 19, postcard, last page.

Flexible Duct Connectors

Prefabricated flexible duct connectors are offered by Cain Manufacturing Co., Birmingham, Ala. Trade named Pre-Fab-Ric, the connectors are made of two strips of galvanized metal joined in the center with a strip of flexible fabric chosen from three materials—canvas, asbestos,



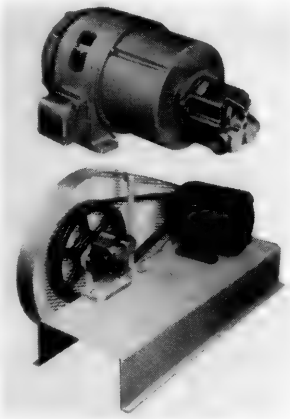
and Neoprene-coated fiber. Fabric and metal strips are double-locked together in a single continuous piece that is coiled in a dispenser-type carton. Cartons contain coils of 25, 50, or 100 ft of the material which is pulled out flat, then formed into the type of duct required.

Metal may be joined by any standard method, while fabric is sewed, stapled, or cemented together. Connectors are available in three grades—Commercial, Economy, Residential. Fabrics without metal are also available for those desiring to make their own connectors.

More information? Circle Item 20, postcard, last page.

Heavy-Oil Pumping Equipment

Webster Electric Co., Racine, Wis., announces production of heavy-oil pumping equipment for commercial and industrial heating plants. The complete sets come in either direct drive or belt drive units, with motors ranging from ¼ to 2 hp. The pumps have capacity ranges from 28 to 575 gph with pressures ranging from 0 to 300 psi. All of the new units are available with built-in relief valves. Separate relief valves are also available if desired for circuit reasons. Direct drive units are motor driven at 900 rpm, optimum speed. This relatively slow speed was selected to lengthen pump life.



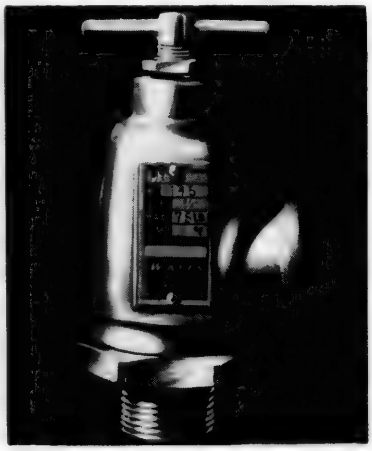
According to the company, the sets were developed basically for industrial and commercial heating units using the lower priced, heavier oils as fuel (Nos. 5 and 6). Units such as these are required for heavy oil moving over heating coils in a fuel tank to maintain a constant viscosity for best burning. Large ports are built into the pumps so that initially cold, heavy oils could be handled without undue restrictions.

The units are also suited for use as fuel pumps for heavy duty oil burners of high pressure, vaporizing, or spinner types. Examples are stationary marine boilers, industrial heating plants, steam generators and melting and processing furnaces.

More information? Circle Item 21, postcard, last page.

High-Capacity By-Pass Valve

A moderately priced, all-bronze, high-capacity, automatic by-pass valve for regulating liquid pressure as



supplied by pressure pumps is announced by Watts Regulator Co., Lawrence, Mass. Valve is set to open at the required pressure. When the system demand is reduced, the excess liquid is by-passed back to the supply.

Models are available with fixed setting for relief-to-atmosphere applications. Available in two sizes, ¾ and 1 inch, for pressures from 10 to 250 psi, valve is designed for pop action and has a high-capacity characteristic. For example, the ¾-inch size, set at 100 psi, will by-pass 42 gpm.

More information? Circle Item 22, postcard, last page.

Lightweight PVC Pipe Fittings

Production of a line of lightweight injection-molded pipe fittings of unplasticized polyvinyl chloride (PVC) is announced by Tube Turns Plastics, Inc., Louisville, Ky. Development of the lighter, more economical fittings will contribute to increased use of lightweight PVC piping systems under moderate pressure and temperature conditions, according to the company.

Wide applications wherever moderate pressures and temperatures permit use of the lighter weights were predicted, particularly for uses such as low-pressure crude oil and natural gas transmission lines, salt water disposal lines in petroleum fields, and water piping systems where salt, hardness, ionization or other factors pose severe corrosion problems. Before lightweight fittings were available, users of Schedule 40 or Schedule A PVC piping systems had to employ unnecessarily heavy fittings to make changes-of-direction or other connections.

Line includes 90-deg and 45-deg elbows, tees, couplings, and caps in ¾ to 2 inch sizes, as well as 3 and 4-inch couplings. Fittings are of the socket type, and come in both Schedule A and Schedule 40 wall thicknesses.

More information? Circle Item 23, postcard, last page.

System Controls Liquid Levels

An air-operated control system that keeps liquid levels from varying more than ¼-inch is being marketed by the Powers Regulator Company, Skokie, Ill. Called the Powers bubbler system, it is based on the fact that a drop in the level of any liquid will reduce the back pressure of air being bubbled through the liquid. This pressure fluctuation can be used to actuate a pneumatic valve on the liquid supply line.

The end of an air line, or bubbler, is placed below the surface of the liquid. If necessary, the bubbler can be coated to prevent caking. Air at 15 psi or less passes through the line, causing a slight bubbling action in the liquid. The air pressure in the line to the bubbler is also transmitted to a static pressure regulator.

Should the liquid drop slightly from its proper level, the pressure of the liquid upon the tip of the bubbler will be reduced. Thus, less pressure is required to force air out of the pipe. This change in pressure is transmitted back to the static pressure regulator. The regulator, in turn, will re-position the company's diaphragm control valve on the liquid supply line, gradually increasing the flow of liquid into the container to regain the proper level.

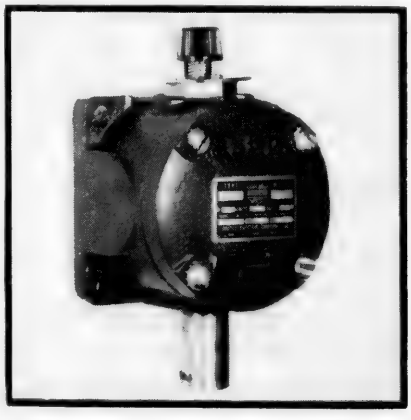
Once installed, the level of the liquid can be adjusted over a range of 1½ inches. The adjustment is made on the control point of the static regulator. Because the bubbler system maintains gradual control of the liquid, there is little wear and tear on instruments and valves.

More information? Circle Item 24, postcard, last page.

Explosion-Proof Control

Type H95 explosion-proof pressure control is added to the line of United Electric Controls Co., Watertown, Mass. This calibrated unit is designed for use where explosive vapors or gases are present.

Pressure settings are made with external adjustment knob and calibrated dial. Models are available with



adjustable range spans between 0 and 500 psi and maximum pressures to 600 psi. Switch differentials in the 22 models range from 1.5 plus or minus ½ inches of mercury to 7 plus or minus 3 psi and may be increased or decreased according to requirements.

There are three standard types of snap-action switches: Class R, normally closed circuit, opens on rising pressures; Class G, normally open circuit, closes on rising pressures; and Class B, double throw with no neutral position. Enclosure casing permits use of this control in Class I, Group C and D locations as defined in the National Electric Code.

More information? Circle Item 25, postcard, last page.

Pipe Finder - Leak Detector

Development of an M-Scope combination pipe finder and leak detector is announced by Fisher Research Laboratory, Inc., Palo Alto, Calif. It is said to combine all the advantages available through new electronic techniques and materials.

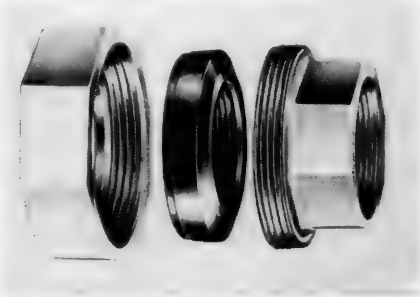
Transistors, printed circuits, Fiberglas cases, and single-turn solid aluminum detecting loops are used. The result is a far more accurate, efficient, and durable detector with greater depth penetration, the company states.

Battery life of the unit is estimated at 1500 hr of continuous operation, at a cost of less than one cent per day. Operating weight: 12 lb.

More information? Circle Item 26, postcard, last page.

Plastic-to-Metal Adapter

A plastic-to-metal adapter is devised by American Vulcathene Div., The Nalge Co., Inc., Rochester, N. Y. It



provides a good mechanical connection between the company's polyethylene traps and fittings and to existing metal pipes and fittings, without the use of clamps.

Adapter consists of a polyethylene gasket, threaded to fit Vulcathene threads, between a metal nut and tailpiece. The inside diameter is made to fit all standard iron pipe sizes. Available at present are 1-, 1½-, and 2-inch sizes.

More information? Circle Item 27, postcard, last page.

Flash-Type Steam Generators

Steam generators of the flash type with continuous coil construction, capable of producing live steam in 2 to 3 minutes and made in sizes from 3 to 30 boiler horsepower, are produced by Malsbary Manufacturing Co., Oakland, Calif.

Each steam generator is a complete package, so compact it can be installed wherever steam is needed, thus saving expensive piping. Even the 30 bhp size requires only 30 by 96 inches of floor space and weighs but 2500 lb. Installation requires no special foundations, walled-in areas, or special insulation; user simply connects steam generator to water, fuel and electricity. Flash type, continuous coil produces quick steam without a boiler, so no licensed operator is required. Burner operates only when steam is needed.

The 15 bhp steam generator illustrated provides steam for degreasing and for heating cleaning and plating solutions in rustproofing plant.

More information? Circle Item 28, postcard, last page.

Evaporative Cooling Technique

Successful development and applications of a new evaporative cooling technique—adaptable to water, freon, ammonia, glycol or other coolants and allowing 100% use of the latent heat vaporization in a unit smaller, lighter, simpler and cheaper than any other currently in use—have been announced by the South Wind Division of Stewart-Warner Corp., Indianapolis, Ind.

The development has been termed the Liquid-Lock system. It permits a liquid coolant to retain its characteristics as a heat sink, yet be formed and handled as a solid. Use of an inorganic wick material, which will retain 90% of its own volume in water, is non-nutrient to fungi and is unaffected by high temperatures is the key to the technique.

System permits boiling or evaporation to take place without use of baffles or valves to prevent spillage, regardless of altitude, while permitting venting of vapors without loss of liquid. Heat transfer surfaces are kept wet, and a more efficient submerged boiling is attained without the problems attendant to handling a free liquid.

In addition to use in open water-boiling systems, potential applications listed by company engineers include freon system evaporators; condensing liquids; removal of free water from gases; cooling units that evaporate water into dry air; holding liquid rocket fuels; airframe panel cooling; commercial and domestic air conditioners; and automotive air conditioners.

Actual applications, reported as successful, include cockpit cooling for fighter planes; component cooling for a jet air liner; cooling of hydraulic and lubricating systems; and cooling of electronic gear, singly and in modules.

More information? Circle Item 29, postcard, last page.

Masonry Drilling Rig

A masonry drilling machine is produced by New England Carbide Tool Co., Medford, Mass. Designed for use with Cyclo-Core carbide-tipped masonry bits, the rig practically eliminates set-up and knock-down time, and greatly reduces drilling time. Manually or hydraulically operated, the compact unit is easily transported to the job and from location to location on the job.

This drilling machine develops up to 1000 lb pressure on the cutting edges of the carbide-tipped bit, and permits holes up to 6-inch dia to be drilled in concrete with or without reinforcing rods. Rig can be easily used in tight corners, and all drilling is done without water.

In actual tests using 2-inch dia bits, company states that holes were drilled in hard concrete containing reinforced rods at the rate of 2 inches per minute average; with no rods, at 3.65 inches per minute. Weight of the rig without inert weight, as shown, is about 200 lb.

More information? Circle Item 30, postcard, last page.

Heat-Transfer Medium

A new ethylene glycol heat-transfer medium for use in snow-melting systems has been developed by The Dow Chemical Co., Midland, Mich.

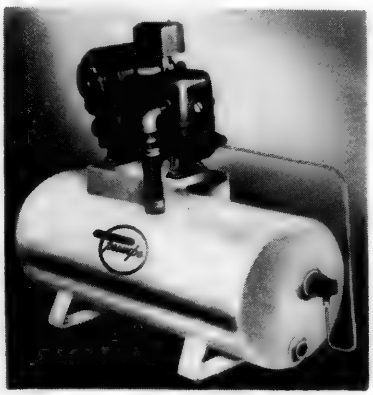
Sold under the trademark Dowtherm SR-1, the product is the first designed specifically for snow-removal systems, according to the company. It contains a special, phosphate-type corrosion inhibitor which the company claims to be more effective in the temperature range at which snow-melting systems operate than the inhibitors used in competing products.

The heat-transfer medium circulates in snow-removal systems at approximately 140 to 160 deg F. It may be heated with steam in a shell-and-tube exchanger, or directly in a boiler.

More information? Circle Item 31, postcard, last page.

Shallow Well Piston Pumps

Two low-priced shallow well piston pumps are announced by Lancaster Pump & Mfg. Co., Inc., Lancaster, Pa.



Model 403 has a capacity of 275 gph at 40 psi, and Model 404 delivers 375 gph at 50 psi. Both models are available on 12-, 17-, or 30-gal tanks. Pumps' many features include automotive-type oil dip stick.

Company asserts that a piston pump is the best water system for all shallow well applications which require extra pressure at low cost.

More information? Circle Item 32, postcard, last page.

Transformer-Type Arc Welder

An industrial transformer-type arc welder of the diverter path design is announced by Hobart Brothers Co., Troy, Ohio.

The diverter path control for adjustment of welding current provides five steps of coarse adjustment (range settings 1-2-3-4-5), with a rheostat for fine adjustment in each range. No high voltage appears across any control coils, eliminating possibility of insulation breakdown or high voltage appearing under the rheostat handle. This type control eliminates the need for moving parts; core and coils are anchored in place for quiet operation and less maintenance.

Model TD-316-S is rated 300 amps at 40-v a-c with a welding range of 35 to 375 amps. Model TD-416-S is rated 400 amps at 40-v a-c with a welding range of 35 to 500 amps. Model TD-516-S is rated 500 amps at 40-v a-c with a welding range of 35 to 625 amps.

More information? Circle Item 33, postcard, last page.

Window Unit at Fan Price

A portable air conditioner is announced by Emerson Radio & Phonograph Corp., Jersey City, N. J., that will be priced to compete with electric fans, the company states.

Unit is described as a precision-tooled portable room air conditioner, with ½-hp compressor, which cools, heats, and dehumidifies; which has variable air directional louvers; weighs 60 lb; operates on 115 volts, drawing 7½ amperes; and can be carried home by the user and installed by the user in minutes, without the use of tools.

Called Quiet Kool Pick Up, unit also features a newly developed Dynel permanent washable filter which can be removed by sliding out without removing the front or any other part of the air conditioner.

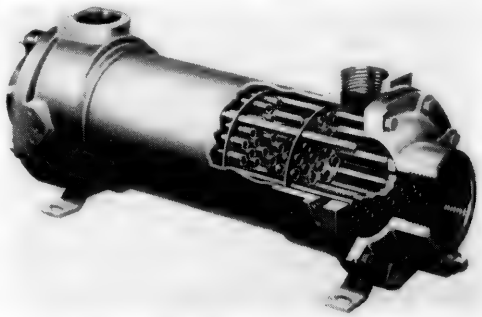
The company expects to sell many of these machines to people who are often too impatient to wait the two or three days to have a window unit installed. Btu ratings will be released after the conclusion of testing.

More information? Circle Item 34, postcard, last page.

Redesigned Heat Exchangers

An expanded line of Type BCF exchangers for 1958 is announced by Ross Heat Exchanger Div. of American-Standard, Buffalo, N.Y. Now offered are 46 sizes, 1-, 2- and 4-pass design, and surfaces ranging from 1.2 to 124 sq ft.

New baffle structure with flanged lip at each tube



hole and around outer edge is said to give tighter tube fit and improved thermal characteristics. Stamped steel feet are movable in three positions around hubs for easy, more adaptable mounting. Hubs are relieved under connections for unrestricted flow. Corrosion resistant copper alloy core assembly and rugged cast iron bonnets are also featured.

Designed for cooling lube oil, jacket water, hydraulic and other fluids, as well as many process heating applications, complete information on the units is contained in Bulletin 1.1K6.

More information? Circle Item 35, postcard, last page.

Gas Flame Safety Control

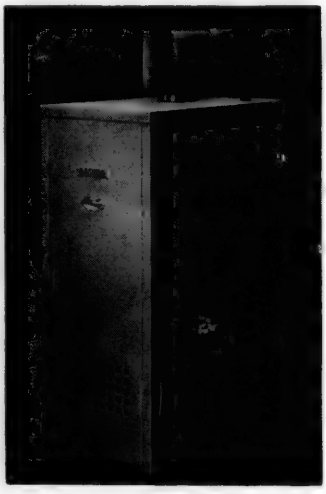
Announcement of R-87 Flamepulse pilot safety control system is made by General Controls Co., Glendale, Calif.

A high-speed thermocouple will respond to flame failure in 5 sec or less. A magnetic amplifier, similar in function to and electric amplifier, but with no vacuum tubes or moving parts, operates a switching relay in response to a signal from the thermostat Relay unit will fail safe on power interruption, component failure, or break in thermocouple circuit. Relay has been undergoing field tests for over three years, company states.

More information? Circle Item 36, postcard, last page.

Eight Water-Steam Boilers

Basmor Series 260 boiler, in 8 sizes, for hot water, steam, or large-volume water heating, is offered by Bastian-Morley Co., Inc., LaPorte, Ind.



Btu inputs range from 100,000 to 450,000 per hr. These hydronic units are designed for economical gas operation, with quality automatic controls and new cast iron burners with stainless steel ribbons. AGA-approved for all gases, including LP gas and LP-air mixtures, they provide efficient heating with panel, baseboard, or conventional radiation.

Among the other features of this boiler are: cast iron sections; patented "staggered heat travel", extra heavy Fiberglas insulation, new "vertical to horizontal" draft hood, and new 6-piece jacket which snap-locks together in less than 5 minutes. A built-in tankless water heater is available in water boilers for supplying low cost domestic hot water. Units have rich brown hammertone baked enamel finish which makes attractive installation in basement or utility room. Fully insulated floor shield permits installation on combustible floor.

More information? Circle Item 37, postcard, last page.

Ultra-Violet Sterilizer

An ultra-violet sterilizer that ends the danger of contaminated drinking water without use of chlorine or other toxic agents is offered by Filtrine Manufacturing Co., Waldwick, N. J. The device, called the Steri-flo sterilizer, destroys bacteria by ultra-violet penetration and is said by the company to purify heavily polluted water at the rate of 400 gph. Designed and tested in accordance with public health standards, it is completely automatic, requires no attention or chemicals, and provides an automatic safeguard against interrupted service.

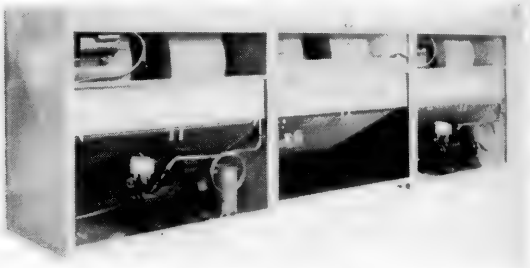
Sterilizer is a 12-inch cylinder of stainless steel adaptable for hoizontal or vertical installation. It contains a battery of low-pressure, cold-cathode ultra-violet tubes, developed by the Corning Glass Works for ultra-violet conductivity, toughness, and many years' service. Within the cylinder, controls and baffles direct water through the battery of tubes so that all water receives thorough penetration by the rays and is completely sterilized at the point of delivery, the company asserts.

A sight-glass on the cylinder permits easy visual inspection and, in the event of power failure or any service interruption, a solenoid valve immediately shuts off the water supply so that no unsterilized water can be accidentally consumed. A by-pass valve enables unsterilized water to be drawn if require.

More information? Circle Item 38, postcard, last page.

Roof-Mounted 15 and 20-Ton Units

Fifteen and twenty-ton self-contained, air-cooled air conditioning units that may be roof mounted are available from Typhoon Air Conditioning Co., Division of Hupp Corp., Brooklyn, N. Y. The units, which may be combined with 340,800 Btu per hr gas-fired heaters to complement cooling capacity and provide year-around air conditioned comfort, eliminate all requirements for valuable inside floor space. With condensing and air handling units arranged horizontally they may also be installed on an outside platform or in any other desirable outside location.



Either model is simply installed with a minimum of duct work to convey conditioned air to inside space through roof or wall. The units (shown with front panels removed) measure, in inches, 88 wide by 33 deep (67½ with gas-fired duct heaters) and 56 high.

The 15-ton model (ACSC-166) consists of two 8-ton air-cooled condensing units on either side of a 15-ton air handling unit. The 20-ton model (ACSC-216) consists of two 10-ton air-cooled condensing units on either side of a 20-ton air handling unit.

More information? Circle Item 39, postcard, last page.

Industrial Air Dryers

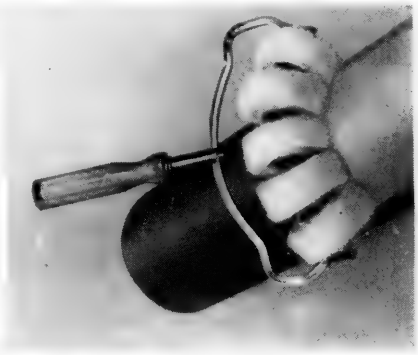
Industrial air dryers which remove water vapor from compressed air to eliminate condensation of water in piping systems are available from Geo. W. Leseman & Co., Torrance, Calif. Manufactured by T. Melsheimer Co., also of Torrance, the air dryers are designed and constructed for continuous, heavy-duty operation in accordance with ASME and ASA codes.

Economical to install, dryers require no foundation. The completed units are shop-assembled on an integral structural steel base, with all piping and controls self-contained. The unit is disassembled for shipment and can be reassembled within a few hours. The main air flow is pipe through the contractor, small cooling water and gas lines are connected, and the dryer is on the line.

More information? Circle Item 40, postcard, last page.

Wrap-Around Paint Roller

A paint roller that wraps itself around pipes, utility poles, and other cylindrical objects is announced by E Z Paintr Corp., Milwaukee, Wis. It is claimed to be the first paint roller to solve the contour problem.



Called Pipe Painter, the new roller consists of five individually sprung segments that adjust themselves to the contour of the subject being painted. When the slight hand pressure is released, the pipe painter returns to its original shape for easy loading in the paint tray. A wood-grip handle adjusts to any position on the U-type frame for ease in covering hard-to-reach areas. The open-end handle is threaded for use with a standard four-foot extension handle.

A smaller version of the device called the Contour Painter is also available. Both units paint flat as well as curved surfaces.

More information? Circle Item 41, postcard, last page.

Overhead Water Cooler

Refrigerated drinking water can now be furnished plant workers by a cooling unit that supplies water to dispensing outlets from an overhead, out-of-the-way position. The Sunroc RP-16C (recessed panel) cooler meets even largest industrial requirements, yet is small enough to be bolted directly to a plant column in an overhead location.

Specifically designed by RPC Div., Sunroc Corp., Glen Riddle, Pa., to overcome the objections to standard floor coolers in industrial areas, this cooler is not subject to damage from materials handling equipment and other heavy-duty industrial machinery.

Coolers are economical to buy and install. Installation is possible, in most plants, by hook-up to existing plumbing and drainage facilities. They can be installed with a minimum of time and expense, and without disruption of plant operation. In addition to low installation cost, they utilize existing drinking fountains and other types of dispensing outlets used for supplying drinking water. These coolers are also economically operated, requiring a minimum of maintenance.

Combining extremely compact size with large capacity, cooler supplies 16 gph of properly cooled drinking water, yet measures only 16¾-inches square. The cabinet-front holds the temperature control which is easily adjustable by authorized personnel.

More information? Circle Item 42, postcard, last page.

Automatic Sump Pump

A new automatic sump pump, which operates by means of ordinary household water pressure rather than from an electrical motor, is being marketed by Jet-Heet, Inc., Englewood, N. J.

Called the Jet Drainer, this pump was developed from a practical application of the aspirating jet principal. Household water pressure is used to create a suction inside the pump which draws water from the surrounding sump.

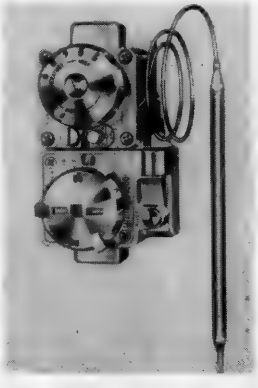
Unlike conventional sump pumps, no float is used in the device since a pressure-sensitive diaphragm is activated by the water from the sump to turn the pump on and off automatically. A special shut-off valve prevents back flow into the sump at low water line pressure.

The model will pump about 14 gpm to a height of 6 ft while using a little over 3 gallons of water under normal city water pressure, the company asserts. It also operates from rural home water systems at pressures above 16 lb.

More information? Circle Item 43, postcard, last page.

Combination Gas Control

A combination control for space heating is introduced by Grayson Controls Div., Robertshaw-Fulton Controls Co., Long Beach, Calif. Designated Unitrol 1000, it combines A and B gas cocks, safe-lighting automatic pilot, pilot filter, pilot flow adjuster, thermostatic gas valve, and pressure regulator in one small compact basic unit.



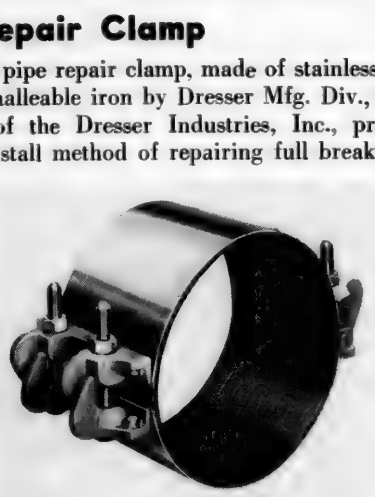
The control has been designed for complete flexibility, thereby making it easy to convert manual units either in the field or factory to automatic controls without use of special tools. The basic unit can be used where only a gas cock and 100% automatic pilot are needed. A gas pressure regulator component can be factory assembled or field installed on any model of the control.

Control also has a pressure tap hole which allows servicemen to make manifold pressure tests without breaking gas lines.

More information? Circle Item 44, postcard, last page.

Pipe Repair Clamp

No. 360 pipe repair clamp, made of stainless steel and Grade A malleable iron by Dresser Mfg. Div., Bradford, Pa., one of the Dresser Industries, Inc., provides an easier-to-install method of repairing full breaks or holes



in asbestos-cement and cast iron water lines in oil fields, water and sewage systems, plants, and factories.

To install, one removes the bolts from one side of the clamp, springs the clamp around the pipe, inserts the bolts, and tightens the nuts. Lug design is said to assure uniform gasket pressure around the full circumference of the clamp.

Besides its use as a clamp, its use as a coupling enables asbestos-cement pipe with broken ends to be joined. Odd lengths of plain-end pipe can also be coupled.

More information? Circle Item 45, postcard, last page.

Building-Block Type Components

A year-round air conditioning system as flexible as a set of building blocks is introduced by Lennox Industries Inc., Marshalltown, Iowa. Engineered specifically for the demands of residential installations which require low power consumption and low noise level, the system brings new efficiency to smaller commercial installations as well.

In the Landmark system, heating, cooling coil and blower-filter elements are enclosed in separate cabinets permitting the correct selection of air delivery, heating, and cooling capacities. From the one series of components, dozens of arrangements may be made. The line includes forced warm air furnaces for gas or oil fuel or electric resistance heating, air conditioners, and combination heating and cooling units. Heating capacities range from 40,956 to 378,000 Btu per hr and cooling capacities from 2 through 10 tons.

At left in photo is Landmark Up-Flo all-season air conditioner with oil-fired furnace. For closet or basement installation, separate cabinets for the heating, cooling, and blower-filter sections are aligned by centering pins into a single assembly. In cases where cooling function is not immediately desired, cooling cabinet and ductwork may be installed with the furnace; cooling coil may be inserted into its cabinet at a later date.

At right in photo is Landmark Store Package cooling unit which also is built out of separate cabinets for cooling coil and blower-filter sections. With use of a diffuser head, as shown, an empty cabinet is used as a spacer to achieve proper height.

More information? Circle Item 46, postcard, last page.

Quick-Response Thermocouple

Trinity Equipment Corp., Cortland, N. Y., announces a line of Silver Speed thermocouples, especially designed to provide near-instantaneous response.

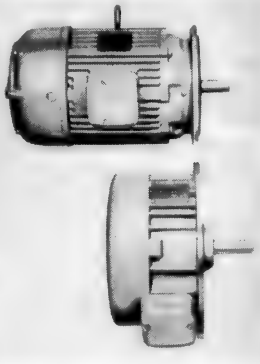
Incorporating a highly-conductive silver tip, and maintaining constant, large-area contact with the thermowell by means of a spring-pressure system, the new line is the company's answer to the demand for a quick-response temperature sensing element.

Full information and specifications are available from the company on Data Sheet No. 12571.

More information? Circle Item 47, postcard, last page.

Motor Length Reduced 60%

The Louis Allis Co., Milwaukee, Wis., recently announced its Pancake motor that reduces motor length up to 60% over standard motors of the same rating. It is designed for use on machine tools, roof-ventilating fans, and other space-cramped applications.



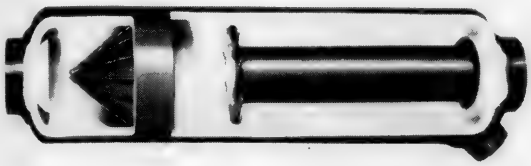
It is a flange type motor of conventional radial air-gap design, and achieves its short length, without any reduction in motor performance, through formed end coils and a one piece housing-bearing bracket. For normal operating conditions the motor is built in an open drip-proof enclosure. Where dirt, filings, corrosive chemicals, coolants or other contaminants are present, it is furnished in enclosed construction.

The motor is available in ratings from 1 to 15 hp at 1800, 1200 and 900 rpm. Additional features include vertical or horizontal mounting, cast iron housing-bearing bracket, modern appearance, factory-lubricated bearings, and quiet operation. Motors illustrated are comparative 5-hp sizes.

More information? Circle Item 48, postcard, last page.

Compressed Air Purifiers

A new helicoid tuyere combined with a secondary vortex breaker is increasing the separating efficiency and widening the range of flow of Type RA Line Purifiers. This results in more complete removal of water, oil, pipe scale, rust and sediment from compressed air, steam or vapor lines, according to the manufacturer, Centrifix Corporation, Cleveland, Ohio.



Having no moving parts to get out of order or require adjustment and maintenance, the unit utilizes centrifugal force to effect a positive separation and is guaranteed by company to remove 99% of all entrainment when properly installed.

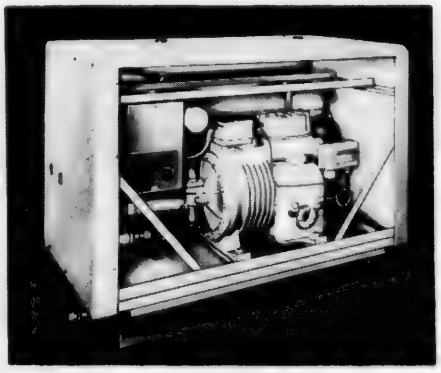
Built as standard units for use in either horizontal or vertical positions, in sizes from 1 to 2 inches horizontal or vertical, and ¼ to ¾ inches vertical only, each has a forged steel body enclosing its stainless or Monel tuyere. It is built to give non-shock service for steam up to 400 psig and 650 deg F, and for compressed air or gas up to 800 psig and 100 deg F.

More information? Circle Item 49, postcard, last page.

Packaged Liquid Chiller

A packaged chiller for water and other liquids is marketed in three sizes from 3 to 7½ hp by Embassy Steel Products, Inc., Brooklyn, N. Y.

Designated as Models EWC-30, EWC-50, and EWC-75, they are engineered to meet liquid cooling requirements



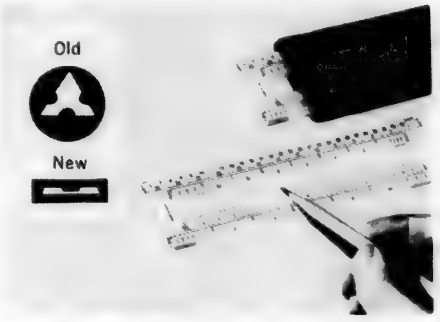
and manufactured to quality standards for residential cooling, industrial processing, and air conditioning applications. Because of their flexibility in application and capacity, they are suited to small and multiple installations, company states.

The chiller is fully insulated and compact. The compressor has a semi-hermetic motor assembly, direct connected, and is spring mounted for quiet operation. The condenser has been selected for low pressure drop and use with city water or a cooling tower. It is semi-cleanable with a detachable head on the water inlet side. Test cocks provide an easy check of the refrigerant level.

More information? Circle Item 50, postcard, last page.

All Scales on One Side

A rule that has eight different scales, all displayed on a single side, is available from A. Lawrence Karp, Greenwich, Conn. It never has to be flipped over, as with the triangular type.



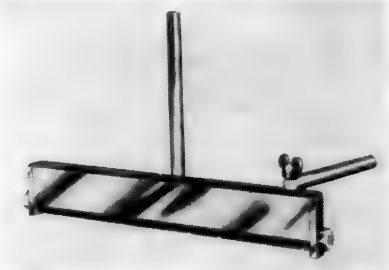
Each scale has its own straightedge, calibrated to professional standards, the company states. Scale is made of clear acrylic, so that scale calibrations become comparative parts of the print, plan, or schematic.

A 6-inch, leather-sheathed pocket model sells for two dollars and a quarter; the unsheathed 12-inch desk scale is three dollars. Both carry graduations of ⅛, ¼, ⅜, ¾, ½, 1, 1½, and 3 inches to the foot.

More information? Circle Item 51, postcard, last page.

Pocket-Size Hand Folder

A rugged hand folder designed to turn drive cleat folds on sheet metal duct or fittings is announced by Duc-Pac, Inc., East Longmeadow, Mass. The folder is made of cadmium-plated steel and is designed to fold either ¼ or



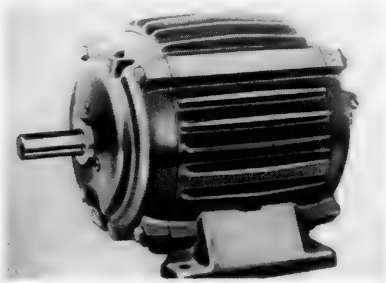
½-inch folds on 2¼, 3¼, 5, 6, or 8-inch duct sizes. When not in use, the handles can be turned flush with the body for easy carrying in pocket or tool kit.

A neat, square drive cleat fold can be made by placing the tool on the edge to be turned, and pulling down the horizontal (in photo) handle. To remove the folder, the vertical handle is then pulled down. There is no need for flattening the fold with pliers as the folder leaves a perfect turn, the company states.

More information? Circle Item 52, postcard, last page.

Airover-Type Motor

Designed by U. S. Electrical Motors Inc., Los Angeles, Calif., is a motor developed for use on ventilating fan applications in which it will be placed in the airstream of the fan it drives. Designated type JN, this motor is of totally-enclosed type, and packs more horsepower in less



space, the company states. As the motor is cooled by the fan it powers, the motor fan and guard, usually provided with this type of motor, are eliminated. Because of this, it is not only more simple in construction, but can be provided at less cost than standard, totally-enclosed motors.

Besides complete protection against pollution, the airover-type motor has many features of construction that protect it against external damage, internal stress, bearing wear, and heat. The motor is available in a range from 1 to 15 hp.

More information? Circle Item 53, postcard, last page.

Portable Spout for Fuel Oil

A portable fill spout with built-in Ventalarm signal is manufactured by Scully Signal Co., Melrose, Mass.

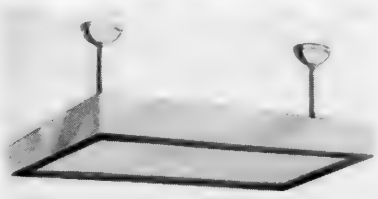
The unit is called Ventafil and is designed for oil deliveries to underground tanks where the fill pipe has a straight drop. It permits filling at fast pumping speeds without danger of blowback or spill.

A feature of the device is the way it is calibrated to permit filling of tanks to point of maximum capacity without the need to measure a tank and refer to a tank chart at each delivery.

More information? Circle Item 54, postcard, last page.

All-Radiant Ceiling Heater

Ampere Industries, Newark, N. J., announces an all-radiant industrial and commercial ceiling electric heater for use in large, open, or even exposed areas.



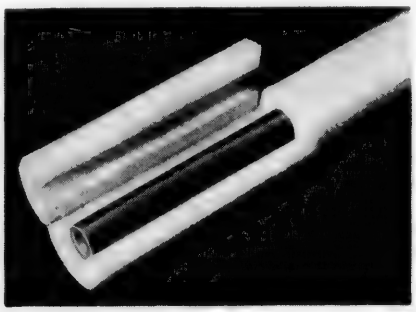
A feature of the Model C-257 heater is the Amp-Quartz element that produces long-wave infra-red rays with a radiant efficiency of 91% by certified laboratory test, company states.

Unit is said to keep individuals comfortable on loading platforms and equally exposed areas. A plant or large room can be completely zoned so that selective areas may be heated. Each panel is equipped with 22-inch suspension rods that firmly secure to the ceiling, holding wires and panel in place.

More information? Circle Item 55, postcard, last page.

Low Temperature Pipe Covering

Low temperature pipe covering with pre-adhesive edges, said to cut application time and costs by 40 to 50%, is announced by the Glo-Brite Products Co., Chicago, Ill., fabricators of Styrofoam, a Dow plastic foam.



Pipe covering is available in a range of diameters suitable for virtually every domestic and industrial application in the low temperature pipe covering, providing insulation, complete vapor barrier, anti-sweat, and anti-drip properties, the company states.

Styrofoam, from which the pipe covering is made, is extremely lightweight, is rot-proof, mold-proof, waterproof, has no odor, and requires no covering or bands.

More information? Circle Item 56, postcard, last page.

Central Vacuum, Pressure Systems

Beach-Russ Company, New York, N. Y., offers fully automatic central station vacuum and pressure systems which are claimed to be mechanically noiseless in operation. The systems require no attention other than periodic routine maintenance and inspection.

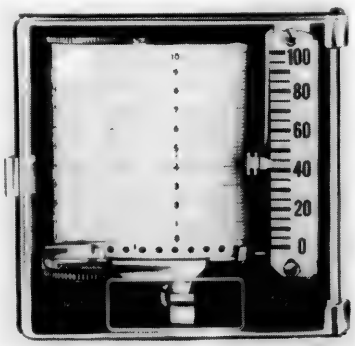
These systems are available in two types, single and duplex. The single system consists of a single Type SS vacuum pump or compressor, motor starter, receiver and regulator complete with auxiliary valves and gauges. It is designed for applications with relatively few outlets and minimum load demand.

The duplex system consists of two Type SS vacuum pumps or compressors, each actuated by its own starter and regulator, and provided with the same receiver and auxiliary equipment as in the single system. Any desired vacuum or pressure is maintained and available in minimum operating time. Both pumps or compressors will cut in and take care of increased load demand. In normal service, the second unit serves as a standby unit. A manual transfer switch is used to reverse the sequence of operation of the two units to assure longer service life. Duplex system gives fully automatic service for any application having varying load demands and multiple outlets.

More information? Circle Item 57, postcard, last page.

Strip-Recording Pressure Gage

A recording pressure gage which uses a 3-inch strip chart is announced by The Bristol Company of Waterbury, Conn. This gage is identical in appearance to the company's line of Metagraphic pneumatic recording receivers.



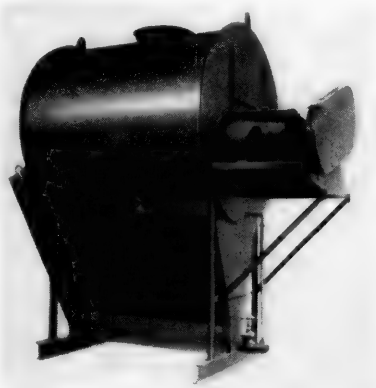
The gages are offered in ranges from 0-3 psi up to 0-60 psi. The recording chassis is interchangeable, and can be plugged in without the use of tools from the front of the panel.

Several versions of the instrument are available. The first will record and indicate one pressure measurement; another will record and indicate one pressure while recording a second; a third version records and indicates one pressure and indicates a second. All models are available with either pneumatic or electric chart drives in a variety of chart speeds.

More information? Circle Item 58, postcard, last page.

Single-Unit Hot Gas Washer

A single-unit hot gas washer which eliminates most air pollution problems and resists temperatures up to 2000 deg F is announced by Lehigh Fan & Blower Div., Fuller Company, Catasauqua, Pa.



The Dynamic hot gas washer is said to do away with the need for expensive brick-lined stacks, settling chambers, fans and gas washing equipment. A compact unit less than 15-ft high, the gas washer can be used for incinerators, melting furnaces, chemical processes, or other conditions where hot air or gases present a dust pollution problem.

Washer is available with manual or automatic sludge removal. For economy where the dust load is light, smaller units are equipped with a recirculating water pump, water level float valve and complete piping. Capacity range is dependent on use.

More information? Circle Item 59, postcard, last page.

Elapsed Time Indicator

Simpson Electric Co., Chicago, Ill., announces the addition of elapsed time indicators to their line of panel instruments.

The indicators are available in 3½-inch round (Model 55ET), 3½-inch round shroud (Model 56ET), and 3½-inch rectangular (Model 57ET) case styling to match company's other panel instruments.

Models are built around a self starting, synchronous clock motor, and are made for either 120- or 240-v operation. The instruments contain auto-resetting counters reading either 099999 or 0-9999.9 hours.

More information? Circle Item 60, postcard, last page.

Utility Watchdogs

A service designed to reduce the costs of electricity and gas purchases made by large and small businesses is offered by American Utility Cost Consultants, New York, N. Y.

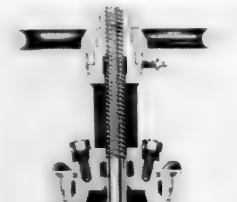
Each month its clients forward their paid utility invoices to the consultant's office. Each bill is checked for accuracy of calculations and proper application of rate schedule. This check starts with the meter readings and is carried through the intricate rate structure to the final total. Then the records of the use of services at each location are analyzed to determine whether or not changes to available optional rate schedules would prove more economical. Investigations are made into the possible applications of beneficial riders, rules, regulations and clauses that are a part of these rates. These analyses can also detect increased charges that result from defective metering devices, the utility consultants state. Where over-charges are found or reductions are available, AUCC guides their clients to the corrections and rate changes that subsequently reduce their costs.

There is no charge for this service unless the consultant reduces costs. When costs are reduced, the fee is a percentage of the monthly amounts saved, limited to a specified period.

More information? Circle Item 61, postcard, last page.

Valve Has Vapor-Tight Seal

Designed by Kerotest Mfg. Co., Pittsburgh, Pa., to handle gases, petroleum products, and numerous other products is a valve which features a principle of operation which completely eliminates galling or wear at the seating surfaces, insurance against product contamination through a vapor-tight seal, time and labor saving design which permits servicing without having to remove the valve from the line, and minimum maintenance.



Driven either by handwheel, gear, or motor, the Keroseal valve is operated by the raising or lowering of the threaded stem. In opening the valve, the counterclockwise turning of the hand wheel first withdraws both upstream and downstream discs from contact with the seat rings in the body before raising them out of position, thereby eliminating drag during the opening operation.

In closing, the discs are held away from floating seat rings until the final point of closure is reached, at which time a wedge type spreader forces the discs against the seat rings. Teflon inserts in the discs form a vapor tight seal.

Valves now available are of carbon steel with flanged ends in 2- through 6-inch sizes, Series 150 and 300 ASA Standards. Standard valves have Hycar O-rings; Teflon O-rings are available for special applications.

Valves of larger sizes, higher pressure ratings, and alloy steel will be in production shortly.

More information? Circle Item 62, postcard, last page.

Industrial Filter

Leaf-type filter elements provide greater filter surface area in Delpark dual manifold filters produced by Industial Filtration Co., Lebanon, Ind.

The filter may vary through the whole range of natural, synthetic, and metallic fibers, depending upon service requirements. The media is supported from the inside by chain link mesh arranged to prevent collapse.

As the elements are backwashed for cleaning, the give or pulsing action flexes sufficiently to loosen adhering particles and the cleaning action is more easily accomplished.

The dual manifold principle permits a reduced filter unit size with automatic self cleaning. While one manifold filters, the other is being backwashed for cleaning.

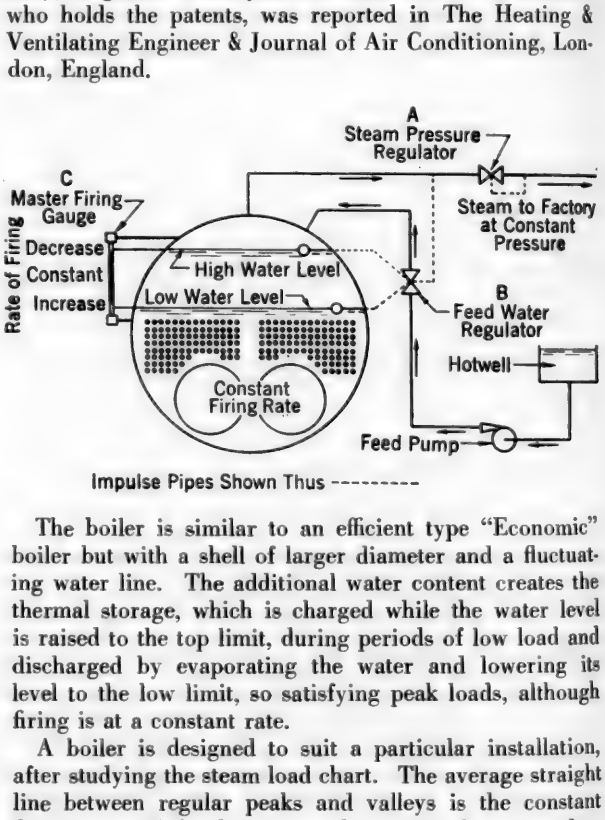
Unit illustrated shows an additional set of skimmer flights for removal of foam created by extremely fine particle suspension. One set of chain driven flights removes sludge from the bottom of the tank blown from the filter leafs during cleaning, and the smaller flights push the foam-borne contaminants to the ramp where they are carried away by the chain-driven flights from the bottom. This particular unit is said to be well suited for the filtration of water from wet type dust collectors and other liquids with high solids content.

Units are available in flow capacities from 5 to 1000 gpm. Higher capacity flows are handled by using multiple units.

More information? Circle Item 63, postcard, last page.

Thermal Storage Boiler

A steam-raising boiler with unique thermal storage characteristics, developed by Edwin Danks Ltd., Oldbury, England, in conjunction with Dr. E. G. Ritchie, who holds the patents, was reported in The Heating & Ventilating Engineer & Journal of Air Conditioning, London, England.



Impulse Pipes Shown Thus ---------

The boiler is similar to an efficient type "Economic" boiler but with a shell of larger diameter and a fluctuating water line. The additional water content creates the thermal storage, which is charged while the water level is raised to the top limit, during periods of low load and discharged by evaporating the water and lowering its level to the low limit, so satisfying peak loads, although firing is at a constant rate.

A boiler is designed to suit a particular installation, after studying the steam load chart. The average straight line between regular peaks and valleys is the constant firing rate and the diameter and water levels arranged so that the usable thermal storage is sufficient to satisfy all normal peaks after being charged in the valleys.

This boiler is very useful where there is a regularly fluctuating heat load for processing and where high-temperature water cannot be the carrying medium because it is essential to use raw or loose steam for processing.

The accompanying illustration explains the arrangement of this system.

DEGREE-DAYS FOR JANUARY, 1958

(A) Airport readings; (C) City office readings; (O) Readings at a point on outskirts of city

AIR CONDITIONING, HEATING AND VENTILATING'S 30th Year of Publication of Monthly Degree-Day Data

City	January			Season to Jan. 31, incl., from Sept. 1		
	1958	1957	Normal	1957-58	1956-57	Normal
Abilene, Texas (A)	642	647	673	1742	1558	1771
Albany, New York (A)	1323	1511	1318	3597	4052	3877
Albuquerque, New Mexico (A)	914	771	970	2743	2561	2727
Alpena, Michigan (C)	1313	1490	1358	4058	4276	4185
Asheville, North Carolina (C)	1010	774	794	2708	2120	2427
Atlanta, Georgia (A)	801	585	632	1939	1399	1757
Atlantic City, New Jersey (C)	962	1019	905	2386	2404	2502
Augusta, Georgia (A)	739	492	521	1738	1214	1356
Baltimore, Maryland (C)	863	983	880	2256	2207	2417
Billings, Montana (A)	913	1663	1305	3496	4098	4044
Binghamton, New York (C)	1245	1355	1218	3475	3579	3635
Birmingham, Alabama (A)	788	530	623	1893	1352	1751
Bismarck, North Dakota (A)	1444	1958	1730	4582	5131	5188
Block Island, Rhode Island (A)	974	1131	1026	2562	2905	2962
Boise, Idaho (A)	1032	1343	1169	3357	3833	3509
Boston, Massachusetts (A)	1046	1284	1113	2715	3241	3121
Buffalo, New York (A)	1231	1370	1225	3474	3513	3649
Burlington, Iowa (A)	1253	1462	1271	3510	3501	1271
Burlington, Vermont (A)	1404	1649	1460	3932	4430	4319
Cairo, Illinois (C)	934	985	856	2296	2155	2321
Charleston, South Carolina (C)	626	414	445	1302	874	1103
Charlotte, North Carolina (A)	849	643	704	2087	1590	1978
Chattanooga, Tennessee (A)	876	688	725	2250	1729	2105
Cheyenne, Wyoming (A)	1081	1365	1225	3890	3939	4065
Chicago, Illinois (C)[b]	1192	1370	1243	3355	3192	3595
Cincinnati, Ohio (C)	1007	1048	942	2595	2351	2653
Cleveland, Ohio (A)	1137	1295	1132	3184	3145	3303
Columbia, Missouri (A)	1069	1222	1091	2921	2662	3058
Columbia, South Carolina (A)	766	531	538	1759	1254	1446
Columbus, Ohio (C)	1096	1181	1051	3013	2794	3046
Concord, New Hampshire (A)	1269	1592	1392	3622	4416	4231
Concordia, Kansas (C)	1050	1347	1144	3025	3095	3192
Dallas, Texas (A)	584	651	607	1445	1453	1477
Dayton, Ohio (A)	1170	1267	1094	3228	3031	3216
Denver, Colorado (A)	986	1206	1125	3167	3281	3473
Des Moines, Iowa (A)	1238	1518	1330	3695	3701	3785
Detroit, Michigan (A)	1182	1355	1203	3409	3412	3528
Devils Lake, North Dakota (C)	1546	1991	1866	5103	5600	5661
Dodge City, Kansas (A)	948	1229	1076	2844	2930	3027
Dubuque, Iowa (A)	1372	1626	1414	4084	4134	4179
Duluth, Minnesota (C)	1513	1954	1696	5098	5477	5229
Elkins, West Virginia (A)	1206	1113	1017	3449	3055	3272
El Paso, Texas (A)	677	478	670	1850	1661	1756
Ely, Nevada (A)	1153	1411	1302	4194	4349	4166
Escanaba, Michigan (C)	1324	1623	1473	4304	4558	4529
Evansville, Indiana (A)	1016	1085	939	2719	2572	2654
Fargo, North Dakota (A)	1470	1935	1795	4729	5150	5333
Fort Smith, Arkansas (A)	809	818	775	2027	1958	2048
Fort Wayne, Indiana (A)	1204	1402	1200	3507	3439	3565
Fort Worth, Texas (A)	615	659	622	1571	1522	1512
Fresno, California (A)	568	692	639	1637	1801	1640
Galveston, Texas (C)	401	206	356	770	507	758
Grand Junction, Colorado (A)	1084	1236	1271	3365	3674	3564
Grand Rapids, Michigan (A)	1290	1393	1287	3828	3652	3879
Green Bay, Wisconsin (A)	1402	1718	1516	4395	4630	4551
Greensboro, North Carolina (A)	946	796	806	2463	2087	2319
Greenville, South Carolina (A)	847	657	673	2105	1643	1873
Harrisburg, Pennsylvania (A)	1070	1139	1051	2970	2973	3022
Hartford, Connecticut (A)	1209	1360	1178	3228	3719	3444
Hatteras, North Carolina (C)	(a)	609	527	(a)	1536	1315
Havre, Montana (C)	1062	1924	1513	3904	4775	4753
Helena, Montana (A)	1129	1962	1469	4105	4798	4716
Houston, Texas (C)	406	254	378	857	617	843
Huron, South Dakota (A)	1296	1766	1597	4056	4497	4600
Indianapolis, Indiana (A)	1136	1280	1122	3250	3046	3263
Jackson, Mississippi (A)	707	491	535	1623	1196	1417
Kansas City, Missouri (A)	1020	1215	1085	2785	2783	2960
Knoxville, Tennessee (A)	902	728	760	2265	1773	2214
La Crosse, Wisconsin (A)	1351	1630	1528	4144	4216	4428
Lander, Wyoming (A)	1258	1553	1494	4410	4442	4803
Lewiston, Maine (O)	1219	1567	1452	3696	4379	4289

(a) Data not available. [b] 1957 and normal figures are for Midway Airport; 1956 figures are for Grant Park Station.

Normal figures in this table are based on 30-year period covering 1921 to 1950, inclusive, as compiled and published by the U. S. Weather Bureau.

Figures in this table, with two exceptions, based on local weather bureau reports. Exceptions are Utica and Lewiston, figures for which are furnished through the courtesy of Coke Sales Department, Central New York Power Corp., Utica, N. Y., and Norman E. Ross, Bursar, Bates College, Lewiston, Me., respectively. [Table concluded on page 118]

Degree-Days for January, 1958 (Concluded)

(A) Airport readings; (C) City office readings; (O) Readings at a point on outskirts of city

AIR CONDITIONING, HEATING AND VENTILATING'S 30th Year of Publication of Monthly Degree-Day Data

City	January			Season to Jan. 31, incl., from Sept. 1		
	1958	1957	Normal	1957-58	1956-57	Normal
Lincoln, Nebraska (C)	1128	1397	1240	3269	3252	3483
Little Rock, Arkansas (A)	753	773	719	1782	1731	1898
Los Angeles, California (C)	160	328	328	419	539	779
Louisville, Kentucky (A)	999	1016	933	2626	2458	2666
Lynchburg, Virginia (A)	969	912	846	2615	2322	2471
Macon, Georgia (A)	689	454	497	1545	1104	1321
Madison, Wisconsin (A)	1360	1605	1417	4117	4109	4124
Marquette, Michigan (C)	1292	1607	1435	4218	4507	4446
Memphis, Tennessee (A)	844	788	725	1974	1757	1973
Meridian, Mississippi (A)	739	463	561	1662	1187	1517
Milwaukee, Wisconsin (A)	1330	1544	1336	3961	3998	3947
Minneapolis, Minnesota (A)	1311	1698	1562	4184	4358	4552
Moline, Illinois (A)	1319	1492	1296	3711	3688	3722
Montgomery, Alabama (A)	692	428	517	1546	1100	1381
Nashville, Tennessee (A)	911	845	778	2298	1890	2150
New Haven, Connecticut (A)	1094	1252	1113	2949	3291	3258
New Orleans, Louisiana (C)	465	211	341	901	520	770
New York, New York (C)	1014	1104	995	2542	2699	2766
Newark, New Jersey	1025	1140	1039	2659	2833	2951
Norfolk, Virginia (A)	852	778	729	1962	1680	1986
North Platte, Nebraska (A)	1175	1512	1271	3610	3867	3835
Oak Ridge, Tennessee (C)	901	723	834	2272	1732	2421
Oakland, California (A)	455	611	552	1393	1731	1629
Oklahoma City, Oklahoma (A)	789	978	843	2272	2294	2210
Omaha, Nebraska (A)	1181	1463	1302	3425	3458	3670
Parkersburg, West Virginia (C)	1068	1093	949	2878	2601	2773
Peoria, Illinois (A)	1233	1424	1240	3418	3400	3552
Philadelphia, Pennsylvania (C)	971	1025	933	2458	2430	2557
Phoenix, Arizona (A)	365	334	425	933	951	980
Pittsburgh, Pennsylvania (C)	1074	1124	992	2908	2712	2882
Pittsfield, Massachusetts (A)	1349	1521	1358	3871	4246	4203
Pocatello, Idaho (A)	1297	1518	1333	4083	4388	4060
Portland, Maine (A)	1183	1580	1373	3542	4368	4149
Portland, Oregon (C)	588	1002	791	2059	2692	2391
Providence, Rhode Island (A)	1057	1303	1125	2911	3406	3320
Pueblo, Colorado (A)	1002	1131	1104	3027	3153	3383
Raleigh, North Carolina (A)	893	748	691	2242	1852	1857
Rapid City, South Dakota (A)	1019	1678	1361	3561	4199	4163
Reading, Pennsylvania (C)	1028	1113	1017	2773	2828	2883
Red Bluff, California (A)	580	687	617	1760	1641	1559
Reno, Nevada (A)	943	1213	1048	3376	3758	3386
Richmond, Virginia (A)	936	916	828	2411	2149	2360
Rochester, New York (A)	1268	1408	1249	3572	3697	3722
Roswell, New Mexico (A)	783	720	787	2271	2145	2202
Sacramento, California (C)	554	652	614	1598	1650	1594
St. Joseph, Missouri (A)	1134	1328	1017	3191	3147	2826
St. Louis, Missouri (C)	1001	1175	983	2608	2599	2686
Salt Lake City, Utah (A)	1053	1203	1194	3435	3652	3473
San Antonio, Texas (A)	453	370	462	1086	874	1062
San Diego, California (A)	170	259	317	421	527	795
Sandusky, Ohio (C)	1180	1314	1122	3252	3156	3238
San Francisco, California (C)	373	494	462	1162	1298	1343
Sault Ste. Marie, Michigan (A)	1477	1748	1587	4553	5004	4927
Savannah, Georgia (A)	644	391	424	1405	953	1099
Scranton, Pennsylvania (A)	1222	1337	1141	3491	3651	3395
Seattle, Washington (C)	574	891	753	2079	2653	2435
Sheridan, Wyoming (A)	1034	1705	1392	3815	4335	4437
Shreveport, Louisiana (A)	616	548	550	1425	1249	1398
Sioux City, Iowa (A)	1258	1593	1423	3722	3893	4131
Spokane, Washington (A)	1015	1547	1243	3533	4286	3948
Springfield, Illinois (A)	1119	1324	1116	3178	3148	3114
Springfield, Missouri (A)	970	1109	1001	2656	2628	2834
Syracuse, New York (A)	1345	1428	1225	3567	3715	3565
Toledo, Ohio (A)	1210	1385	1197	3511	3499	3561
Topeka, Kansas (C)	1023	1246	1088	2846	2869	2979
Trenton, New Jersey (C)	1027	1115	1004	2685	2771	2856
Tulsa, Oklahoma (A)	803	957	856	2130	2196	2238
Utica, New York (O)	1489	1343	1248	3839	4194	3785
Valentine, Nebraska (A)	1157	1673	1361	3749	4171	4070
Walla Walla, Washington (C)	766	1371	1023	2623	3420	2989
Washington, D. C. (C)	946	985	884	2478	2336	2488
Wichita, Kansas (A)	931	1190	1023	2733	2767	2786
Williston, North Dakota (C)	1320	1963	1705	4454	5146	5200
Winnemucca, Nevada (A)	1023	1336	1153	3720	4105	3748
Yakima, Washington (A)	924	1515	1181	3286	4091	3650

For footnotes, see page 117.

NEWS OF THE MONTH

ASHAE AND ASRE

consider merger; membership to be informed of plan so that final vote can be taken at winter meetings.

In a joint statement, issued on January 28, the American Society of Heating and Air-conditioning Engineers and the American Society of Refrigerating Engineers, have unanimously approved further study of a method for merging the two societies as prepared by the ASHAE-ASRE Committee on Cooperation.

The ASHAE and ASRE councils have also approved presenting the plan for merging to their memberships through regional and sectional meetings during the Spring of 1958.

Both societies, providing a subsequent committee report is approved by their councils in June, will present the method of merger to the members attending the 1958 summer meetings and they will request approval to submit the proposition for membership vote at the winter meetings of the two societies.

MANAGEMENT-LABOR COMMITTEE

will seek to promote wider cooperation for all those engaged in plumbing and mechanical contracting.

A new Joint Industry Program Committee, composed of officials of the National Association of Plumbing Contractors, the Mechanical Contractors Association of America, and the United Association of Plumbers and Pipefitters, has been formed for the plumbing and mechanical contracting industries.

The new Committee will supplement activities of the Industrial Relations Council, which has been in existence to serve the three organizations since 1950. It will be composed of the three top officials of each organization, along with Executive Secretaries, Jerome O. Hendrickson, NAPC, and Lloyd Gruman, Jr., MCAA, who will act as co-secretaries.

While the Industrial Relations Council has made commendable progress in the minimizing of industrial strife, says NAPC, the object of the Joint Industry Program Committee will be to go beyond this field. It will seek to promote wider cooperation between management and labor for the positive benefit of all those engaged in the affected industries and the public as well.

The chairmanship of the committee will rotate among the groups annually. Joseph H. Spitzley, President of MCAA, was elected the new committee's first chairman.

A NEW WROUGHT IRON

with greatly superior resistance to corrosion is developed after 17 years of testing. Price line held.

A most significant development in wrought iron metallurgy, announced by A. M. Byers Co., Pittsburgh, Pa., is called 4-D Wrought Iron. The results of seventeen years of in-service and laboratory tests that have been conducted, comparing the new metal with standard wrought iron and with a number of other metals, have shown a greatly superior resistance to many kinds of corrosive forces, including those caused by severe industrial atmospheres, acid solutions, salt water, and steam condensates.

• **SUBSTANTIAL SAVINGS**—Only time will tell how much, of the billions of dollars lost each year through material failures caused by corrosion, the company states, will be saved through the use of this new product, but it will undoubtedly aid substantially in reducing these losses.

• **NEW FORMULA**—According to E. P. Best, chief metallurgist, the improved 4-D wrought iron was achieved by substantially increasing the deoxidation of the base metal; increasing the phosphorous content in relation to the other material components; and using a more siliceous silicate fiberous material. Approximately 250,000 of these silicate fibers are evenly distributed throughout each cross sectional square inch of the metal.

Center of operations for the world's first full-scale atomic-electric generating station exclusively for civilian needs at Shippingport, Pa., is this elaborate control room. All "instructions" to the nuclear reactor, its associated equipment, and the turbine-generator are issued by three operators sitting at this console panel. In the foreground are controls for the power distribution system; the center section is devoted to the turbine-generator portion, and in the background the third operator controls the nuclear reactor. The Shippingport plant is a joint project of Westinghouse Electric Corporation, Atomic Energy Commission, and Duquesne Light Company of Pittsburgh.

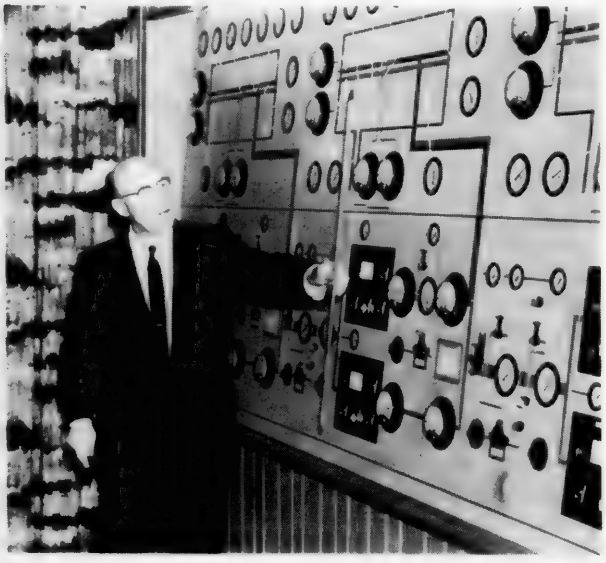
Tests have shown that new wrought iron has greater uniformity, plus improved physical and mechanical properties.

• **SAME PRICE**—4-D is simply a marketing term used to distinguish the new wrought iron from standard wrought iron. Although production costs will be increased, they will be absorbed by the company, and the new product will sell for the same price for which standard wrought iron has sold.

BUILDING DESIGN

facilitates demonstration of company's building products and high velocity air distribution system.

Use of cellular steel flooring as a new concept in air distribution for heating and cooling is demonstrated in a two-story office building opened by H. H. Robertson Company at Ambridge, Pa. The building is also used to demonstrate the application of other company products in building construction.



Company engineer uses the control panel to explain the principles of the air distribution system.

To demonstrate the effectiveness of this type of floor for year-round air conditioning distribution, there is an elaborate and complex control panel on the first floor. This enables the visitor to take readings of air velocity, humidity, temperature and other data for various areas. Banks of dials and gages show readings for conditions in various parts of the building and within the floor system itself.

In addition, there are open spots in the floor and ceiling, covered by a clear plastic, which permit one to view the operation of controls such as dampers and air blenders for a better understanding of the system.

This type of cellular flooring was developed more than 25 years ago for an electrical distribution system. It is adapted for use in dual duct high velocity air distribution to replace the conventional large ceiling ducts. Floor-to-ceiling dimensions in office buildings are reduced.

EMERGENCY FORMULA

for roof ventilation of industrial plants will aid fire control and minimize damage to building structure.

Monitors or ventilators, combined with draft curtains of sheet metal or other non-combustible materials, at specified intervals within a roof area, will vent smoke and hot gases with sufficient effectiveness in an emergency to aid fire control.

The formula was evolved from studies for General Motors Corp., Detroit, Mich., by Armour Research Foundation, Illinois Institute of Technology, with a scale model building outfitted with fire and smoke generating apparatus. Measurement of heat vented through roof openenings in the scale model appeared to represent with reasonable accuracy the relative quantities of heat that would be vented from a full scale building, according to John J. Cronin, GM vice-president in charge of the manufacturing staff. Purpose of the tests was to find out whether special ventilators or the conventional monitors, or both, on industrial building roofs provide safeguards against accumulation of smoke and hot gases over a fire area in a plant.

Experience in the 1953 Detroit Transmission Division fire at Livonia, Mich., Mr. Cronin said, indicated that concentration of smoke and hot gases beneath the plant roof not only contributed to fire damage by actual combustion, but also caused structural failure by rapidly overheating the roof trusses or upper framework. The problem, therefore, was to find out whether a general formula or method could be devised for venting of gases from a fire area to preserve the building structure, protect personnel and aid fire-fighting crews in isolating damage, he said.

• **APPLICABILITY**—The findings are amenable to reasonable interpretation. They are not considered hard and fast rules even within General Motors, but they are considered an important research contribution to the problem of emergency ventilation of buildings. Recommendations are not related to any standards or regulations of other organizations, and they apply only to GM plants, as many of the ventilation problems would not be applicable to those of other industries or plants.

A preliminary study of the emergency ventilation problem revealed very little recorded experience and few technical facts about the physics of such fire action in an industrial plant. Thus, scale model tests in this unexplored field were designed to get fundamental mathematical data on which suitable standards for emergency ventilation could be based. In special cases it would be possible, or even necessary, to deviate from the formula.

• **THE FORMULA**—In brief, the formula outlines vent-to-floor area ratios which are related to the particular degree of fire hazard involved in a plant or certain areas of a plant. A similar ratio for use of draft curtains over various size building bays also depending on the degree of hazard, is provided for.

In effect, draft curtains in prescribed locations on the underside of the roof, fence off ceiling areas to confine the smoke and hot gases within zones from which they can be vented via monitors or roof ventilators.

(News of the Month continued on page 123)

Buensod pioneered and introduced proper controls for Dual-Duct Air Conditioning. Inherently, such systems have unstable pressures—yet provide the greatest flexibility of control for the occupants. So the problem was to make . . .

STABLE ual-duct syst n

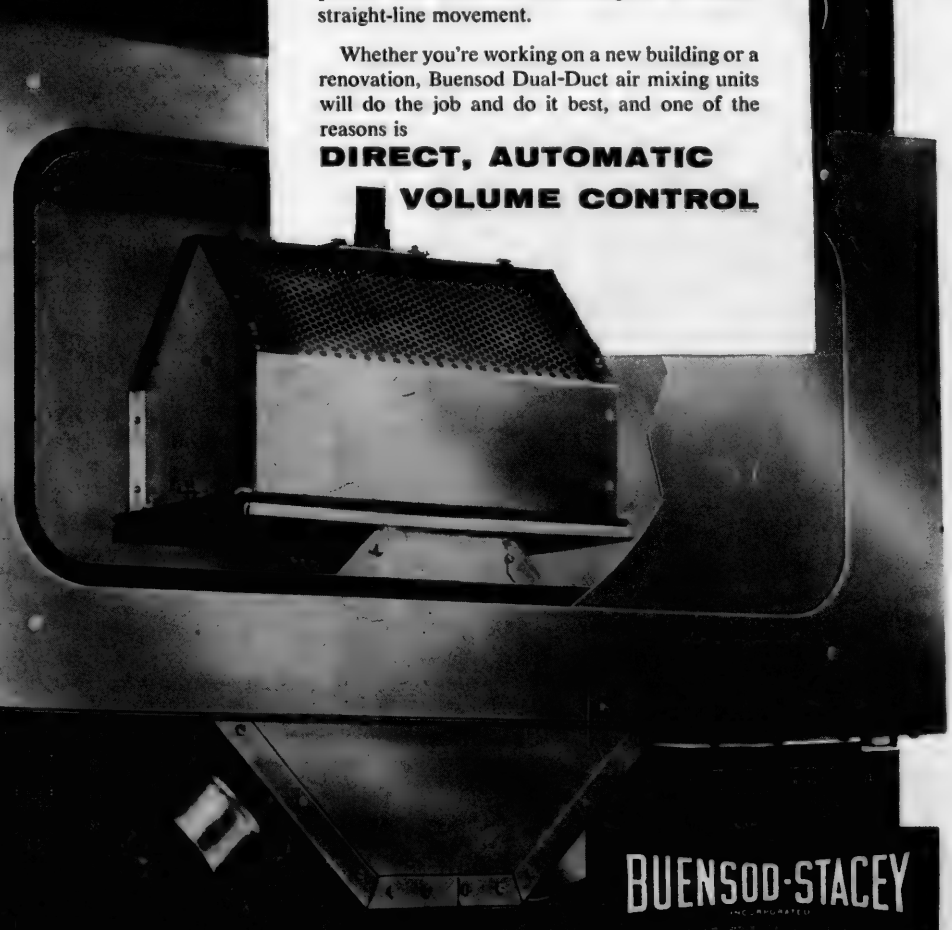
Buensod does it automatically and without a sensing instrument or complicated electronic device. This is DIRECT, AUTOMATIC VOLUME CONTROL. No matter what the variance in static pressures, a constant quantity of air is maintained in each unit. This makes it *impossible to unbalance any zone in the system.*

And it's so simple. A screw setting of spring tension at the time of installation and the unit need never be touched again. If after installation, a change of air volume in a particular zone is desired, it can be made quickly by adjusting one nut. When desired, volume adjustment can be pre-set at the factory by calibrated flow meters, eliminating the need for field adjustment. This, in effect, balances the entire system without necessity of a field check and re-balancing.

Compressed air from a local thermostat controls the mixing valve. No linkage. No pivot points. The valve has been designed for direct, straight-line movement.

Whether you're working on a new building or a renovation, Buensod Dual-Duct air mixing units will do the job and do it best, and one of the reasons is

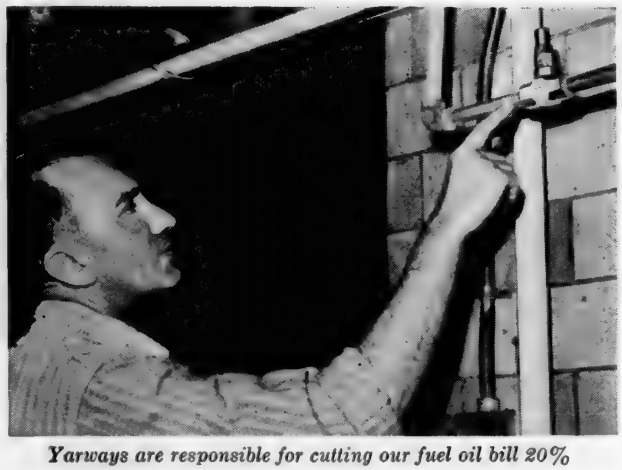
DIRECT, AUTOMATIC VOLUME CONTROL



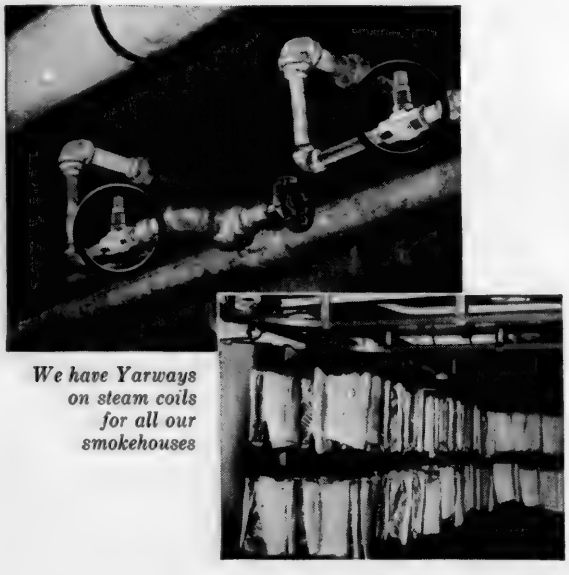
BUENSOD-STACEY

BUENSOD-STACEY, Inc.

"these steam traps save us 30,000 gals. of fuel oil a year"



Yarways are responsible for cutting our fuel oil bill 20%



We have Yarways on steam coils for all our smokehouses

Q. Mr. Melcher*, you've been using Yarway Impulse Steam Traps in this packing plant for over two years. What's your experience?

A. It's all been good. As a direct result of changing to Yarway Traps we save 30,000 gallons of fuel oil a year—or about 20% on our oil bill. Temperatures now stay hot and steady.

Q. Where do you have these Yarway Traps installed?

A. On all the steam coils for the smokehouses, heating exhaust fans and hot water generators.

Q. How about maintenance?

A. We haven't touched a Yarway Trap in the two years we've had 'em. With only one small moving part, there's not much to go wrong. Previously, with other traps, we averaged over $300. a year for trap maintenance.

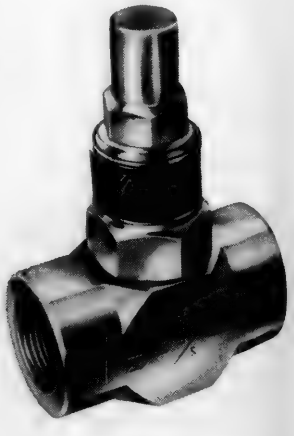
Q. You'd recommend Yarway Impulse Steam Traps, then?

A. I don't have to. The record speaks for itself!

If you'd like a copy of a new booklet, "The How and Why of Steam Trapping", drop a card to

YARNALL-WARING COMPANY
104 Mermaid Avenue,
Philadelphia 18, Pa.

*GEORGE E. MELCHER,
*Chief Engineer,
large eastern meat packing plant.*



YARWAY

...a good way to specify steam traps

OVER 1,200,000 YARWAY IMPULSE STEAM TRAPS ALREADY USED • STOCKED AND SOLD BY 275 CONVENIENT LOCAL INDUSTRIAL DISTRIBUTORS • NATION-WIDE YARWAY ENGINEERING STAFF AT YOUR SERVICE.

WESTERN CONFERENCE

to feature symposium on school climate control, filter testing, and technical sessions on air conditioning.

Western Air Conditioning Industries Associaiton has announced an interesting and comprehensive conference program in connection with its exhibit scheduled for May 7-11, 1958 at Shrine Exposition Hall in Los Angeles, Calif. Day and evening sessions will be held. Included in the program are:

1. Symposium on School House Environmental Control, covering steam and hot water systems, radiant heating, ventilation, cooling, heating, central air systems, unitized room systems, and the architects' view on the subject.
2. Symposium on Codes and Standards.
3. Symposium on Air Cleaning where a panel of four will discuss informally each of the following: Efficiency with respect to particle size, The Truth About Filter Testing, Smog Removal.
4. Symposium on Air Conditioning Existing Buildings, with panel members representing owners, engineers, structural, contractor, architect.
5. General technical sessions will include subjects of major interest such as—High Temperature Water, Water Conservation, Air Conditioning Existing Residences, Residential Heat Pumps, The Last Seven Degrees, Low Temperature Design Techniques, and Large Absorption Systems.

According to Fred J. Tabery, exhibit manager, reservations for exhibit space already exceed the total space in the 1957 show. Information on the exhibit and conference program may be obtained from Mr. Tabery at 3443 So. Hill Street, Los Angeles 7, Calif.

INDUSTRIAL HYGIENE PROGRAM

instituted in Weirton in 1953, is commended by Iron and Steel Institute, watched by other steelmakers.

A continuing anti-pollution campaign, now in its fifth year at Weirton Steel Company division of National Steel Corporation, Weirton, W. Va., has produced one of the healthiest working environments in the steel industry. The program's status in the anti-pollution field is evidenced by the fact that other steel companies are showing a continued interest in its progress.

C. J. Klein, vice-president-engineering, who issued a report with J. H. Strassburger, assistant vice-president-engineering for National Steel, on the steps that Weirton Steel has taken to combat air and river pollution and extend industrial hygiene for protection of its employees, said that coupled with the in-plant anti-pollution campaign is a companion program to benefit the City of Weirton and the surrounding area.

The Company's industrial hygiene program, which recently received a commendation from the American Iron and Steel Institute, was begun in 1953 and is dedicated to improving the environment both in and outside of the plant area.

• **AIR POLLUTION TACKLED FIRST**— A study of atmospheric conditions made by the company in its plant areas, and in the City of Weirton revealed that while air pollution in the city presented no health hazard to residents but simply represented a nuisance, in the plants there was the possibility of employees being exposed to toxic fumes, gases, dusts and, in some cases, excessive heat. As a result of these findings, it was decided that this was the segment of air pollution which should be given priority.

A department of Industrial Hygiene was established.

• **MAJOR PROJECTS**—One of the major projects undertaken in the campaign is a system of palm oil mist collection and removal at the No. 7 tandem mill in the 54 Inch Strip Steel Department. The system, installed at a cost of a quarter of a million dollars, collects and removes from the tandem mill the palm oil mist that in most similar operations is exhausted through the roof and settles on surrounding community property.

All four of the company's continuous sulfuric acid picklers have been equipped with collection and removal systems for acid mists to protect employees working near the picklers and prevent the mists from reaching property in the community.

In the Steel Works, gas burners have been installed high in the air to burn all waste blast furnace and coke oven gas which formerly was permitted to enter the atmosphere. Such gases are toxic agents in their original state but become relatively harmless products of combustion after leaving the gas burners.

A new addition recently was completed at the cinder yard, commonly known as the "skull cracker," to allow longer cooling periods for open hearth slag. This helps reduce the dust in various areas of the community.

In addition to these installations on existing equipment, Weirton Steel has also placed installations on new equipment as a preventative measure to assure that no new pollution problems will be permitted to exist. A new automatic scarfing machine, an installation which has posed a new threat to air pollution in and around most steel companies, represents no threat to health due to wet dust collectors placed in the exhaust stack of the machine at the time of installation.

At the new No. 2 sinter plant, the company has provided for the installation of pug mills and dust collectors which will reduce dust levels inside the plant and virtually eliminate the discharge of dust from the plant's stacks.

• **WATER POLLUTION**—To cooperate in the eight-state compact designed to clarify the waters of the Ohio River, a number of installations were designed to prevent waste material from entering the river.

A gas washer pumping and collection system with two 80-ft clarifying tanks recovers flue dust from the company's blast furnaces, and the clarified water flows in the river. This system prevents more than 100 tons of flue dust per day from going into the river.

The company is completing the engineering on separating sanitary from industrial sewers in anticipation of the new City of Weirton sewage disposal plant, and at the company's Steubenville Plant the sanitary sewers have been separated from industrial sewers, with sanitary sewage going to the city's sewage disposal plant.

(News of the Month concluded on page 139)

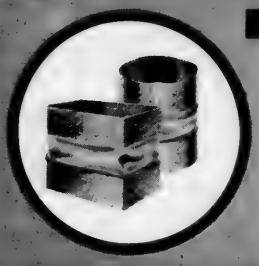
ALL SHIPPED IN
DISPENSER-TYPE CARTONS

CAINS

COILS OF PROFIT

Quick, Economical, Easy, and Practical Methods for - - -

FABRICATING FLEXIBLE DUCT CONNECTIONS
VANES FOR ELBOWS • AIR SCOOPS AND LOUVERS



PRE-FAB-RIC

A PREFABRICATED FLEXIBLE DUCT CONNECTION

Using a fabric (of your choice) in the center with a galvanized metal strip on each side. *Double-Safe Locked* together in a single continuous piece, coiled in a dispenser-type carton ready for use

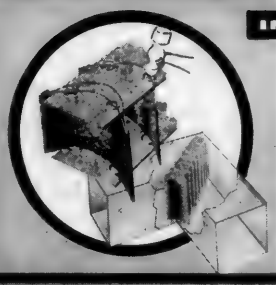
A TYPE, SIZE, AND PRICE FOR ALL JOBS

THREE GRADES
Commercial - Economy
Residential

THREE FABRICS
Canvas - Asbestos
Neoprene

FAB-RIC

TOP QUALITY FABRICS (Without Metal)
Same Weight and Width (5") Used in PRE-FAB-RIC. Put Up in 100' Rolls



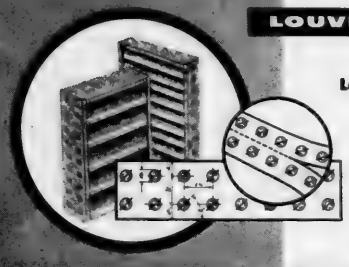
INSTANT-VANE RAIL

ELIMINATES

Layout, Tab Cutting, Hole Punching, Spot Welding, Riveting, Etc., Results in a Savings Up to 70% over old methods.

Best method ever devised for installing turning vanes (single or double) in sq. elbows.

100 FT. COILS — ENGINEER APPROVED



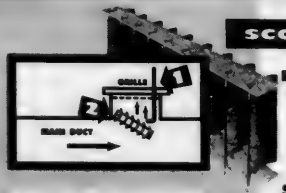
LOUVERAIL

ELIMINATES

Layout, Tab Cutting, Hole Punching, Riveting, Spot Welding, Etc.

AN ECONOMICAL AND PRACTICAL METHOD FOR FABRICATING LOUVERS — REMOVABLE, HINGED, OR STATIONARY. LOUVERAIL is 24 ga. galvanized 4½" wide in (2—50' lengths) 1 right and 1 left coiled together.

Split (½) Rail for Louver Thicknesses From 1¼" to 1¾"
Use Full Size Rail for Louver Thicknesses From 3¼" to 4"



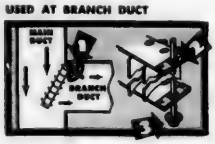
SCOOP-RAIL

ELIMINATES —
- Radius ell, transition, and splitter damper at branch duct take-offs.
- Volume damper on grille.
- Job delay in ordering.

1. Not necessary to remove grille to adjust volume. Use bent rod or wire thru grille to adjust unit in and out of main duct.
2. S. M. screws at top and bottom.

SCOOP-RAIL for fabricating air scoops for branch ducts and grille collars. Insuring uniform air distribution. Complete control of air volume in branch duct or at grille face. Simplifies balancing of the system.

USED AT BRANCH DUCT



1. ⅜" standard quadrant where accessible.
2. Speed nut tabs for ⅜" square rod are riveted, spotwelded or s. m. screwed to ends of SCOOP-RAIL.
3. Where desired clg. control may be used.

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NEW CATALOGS

Use the prepaid postcard on last page for securing your copies of catalogs described in this department.

ELECTRIC UNIT VENTILATOR—Edwin L. Wiegand Co., Pittsburgh, Pa., offers illustrated, descriptive bulletins and sample specifications on its Chromalox automatic electric unit ventilator. The new all-electric unit supplies heat and natural cooling, and ventilates with fresh outdoor air. It is designed to eliminate stuffiness in large rooms wherever it is normal for many people to gather in a relatively confined space.

Circle **Item 64** on Inquiry Card

DIRECT-DRIVE BLOWERS — Published by Fan and Blower Div., Peerless Electric Company, Warren, Ohio, is a catalog on the company's non-overloading Class 1 direct-drive blowers. The 2-color catalog covers general construction features, ratings, performance data tables, motor construction, dimensions and recommended specifications. Various types of direct-drive blowers are also shown.

Circle **Item 65** on Inquiry Card

THREE-WAY CONTROL VALVES—Four-page Specification S810-16 from Valve Div., Minneapolis-Honeywell Regulator Co., Fort Washington, Pa., gives full details of construction on Series 800, 3-way control valves. Covered are both single and double-seated designs for mixing or diverting service. Included in the specification are sizes, materials, pressure ratings and cross-section drawings of body types.

Circle **Item 66** on Inquiry Card

FIRE PROTECTION EQUIPMENT — For the first time, to the company's knowledge, a handy reference has been published which digests the mass of data available on all but the sprinkler form of fire protection. Called Checkbook, it is available from W. D. Allen Manufacturing Co., Chicago, Ill.

Circle **Item 67** on Inquiry Card

ZONED HYDRONIC HEATING SYSTEM —Edwards Engineering Corp., Pompton Plains, N. J., announces publication of a 4-page bulletin describing zone-controlled hot-water heating systems. Quick-acting motorized valves, a plug-in electrical connector and expansion tank with connecting tubing and air elimination devices are featured in the complete boiler-burner zone-control package. Bulletin includes capacities and specifications for the complete series of gas and oil-fired residential boilers from 100,000 to 200,000 Btu per hr, as well as capacities and data for baseboard radiation.

Circle **Item 68** on Inquiry Card

(Continued on page 126)

*Consulting Engineer:
Hollis U. Bible, Houston, Texas

KERR'S
HIGH STYLE . . . IN AIR CONDITIONING WITH 22 BIG THERMAL UNITS

Kerr's Incorporated*, Oklahoma City, helps maintain its reputation as one of Oklahoma's finest department stores with its comfortable year around Thermal Engineering air conditioning. Twenty-two big Thermal central plant units effectively combat the rapid variations of Oklahoma weather by maintaining an always delightful climate throughout the entire building.

Thermal Engineering manufactures a quality line of air conditioning equipment for every type of structure. Write for complete information on central plant and multizone conditioners, sprayed coil units, heating and ventilating units, heating and cooling coils, and air-cooled condensers.

Agents in principal cities.

Quality Products Since 1945.

THERMAL ENGINEERING CORPORATION

2605 W. DALLAS • P. O. BOX 13254
HOUSTON 19, TEXAS

Which of these ventilation problems do you want solved?

General ventilation and comfort cooling? Removal of fumes, dust, heat and steam? Air circulation, rapid product cooling and drying?

Power Line

solves it these 5 ways surer:

1. Complete line: Broadest product line of air-moving equipment for every industrial requirement.

2. Certified performance: All Power Line Fans are rated by PFMA and NAFM.

3. Backed by 33 years of specialization in manufacture of highest quality ventilation equipment.

4. Competitively priced to give you important cost savings in initial investment and in maintenance. You get the precisely right product to fit your requirements. You don't over-buy with equipment too large or under-buy with equipment too small.

5. Sold only through qualified ventilation specialists. You get expert technical advice and service from the survey of your requirements right through to the completion of your installation.

YOURS ON REQUEST: Big 20-page Power Line Catalog gives complete facts about industrial ventilation, including selection of proper type and size of fan, calculation of dust resistance, and installation procedures, plus features, dimensions, specifications and performance data. Without obligation write for your free copy of Catalog No. 63A.

POWER LINE FAN COMPANY, INC.

Subsidiary of **Chelsea Products, Incorporated** 639 South Avenue, Plainfield, New Jersey

NEW CATALOGS

(Continued from page 124)

Use the prepaid postcard on last page for securing your copies of catalogs described in this department.

HOT WATER STORAGE HEATERS — A 16-page booklet, No. 512, is published by Richmond Engineering Co., Inc., Richmond, Va., and deals with the Reco line of hot water storage heaters. Booklet includes seven tables of capacities, dimensions, and conversion factors, along with instructions for their use in selection of the proper heater for a particular application.

Circle **Item 69** on Inquiry Card

PLASTIC-PIPE CLAMPS—A catalog sheet, PP-1057, describing two types of Suretite stainless steel clamps for plastic pipe is available from Wittek Manufacturing Co., Chicago, Ill. The types offered are a deep-slotted screw head and a collared head. A feature of both is the welding method of assembling heads to the band, a process giving maximum resistance to corrosion.

Circle **Item 70** on Inquiry Card

VALVES FOR AIR CONDITIONING — A 20-page catalog giving size and application data for a complete line of refrigeration and air conditioning brass valves, accessories and fittings, is issued by Superior Valve and Fittings Co., Pittsburgh, Pa. Catalog R-6 incorporates recent technical data on ASME-approved relief valves, hermetically fused sight glasses, and high capacity heat exchangers.

Circle **Item 71** on Inquiry Card

POWER ROOF VENTILATORS — A new selection guide to the company's low-silhouette line of power roof ventilators is announced by Ilg Electric Ventilating Co., Chicago, Ill. Data is given on the Type Q quiet propeller fan with air-flow design that insures high ventilating efficiency. Also described is the company's direct-connected motor that keeps maintenance cost down. Dimensions, capacity tables, and details on accessories and protective coatings are included.

Circle **Item 72** on Inquiry Card

LOADERS, SHOVELS, AND BACKHOES —A 3-color folder picturing and describing in detail the company's recently introduced line of loaders, tractor shovels, and backhoes, is published by Henry Manufacturing Co., Topeka, Kan. While the folder's primary emphasis is on the new equipment line, other earth moving equipment manufactured and marketed by the company is also described.

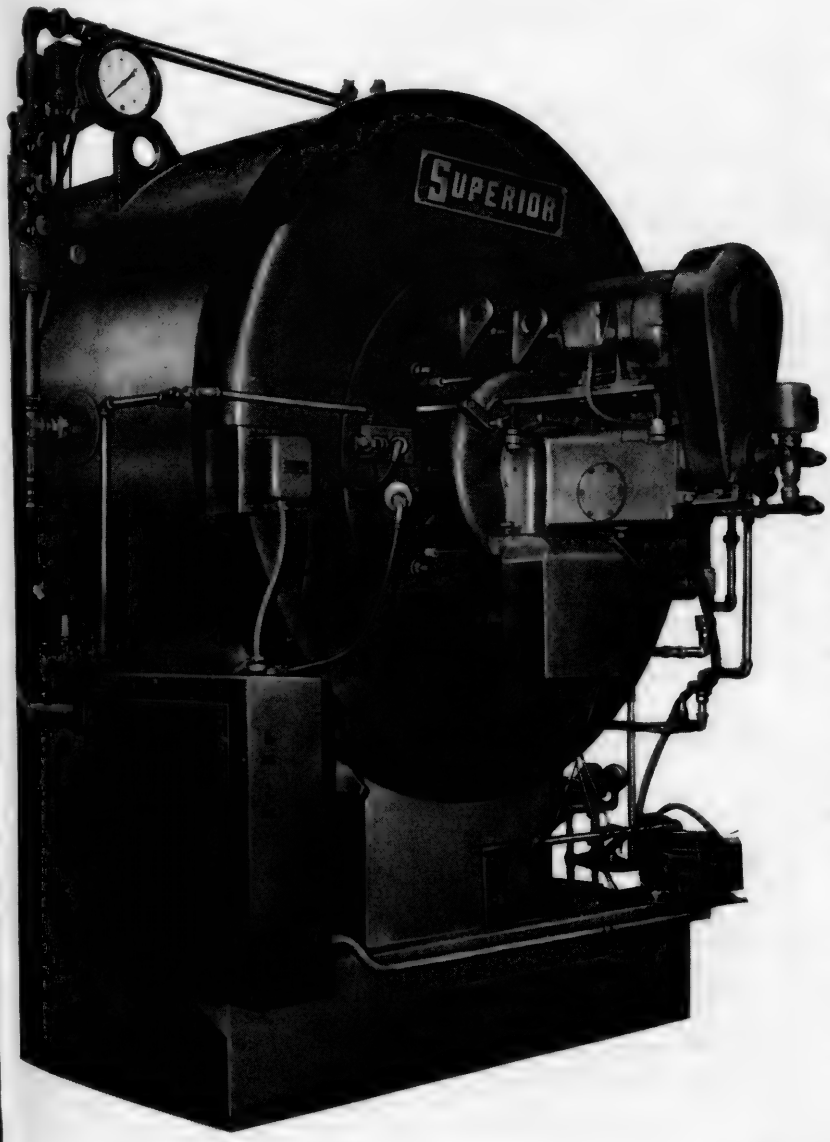
Circle **Item 73** on Inquiry Card

(Continued on page 128)

a completely packaged boiler
for capacities from 20 to 200 b.h.p.

SUPERIOR "COMPACT"

compact . . . but with no concession to dependability.



The Superior COMPACT boiler combines reduced over-all dimensions with rugged, practical boiler construction.

Completely packaged and factory fire-tested, the COMPACT is equipped with a dependable Superior Rotary Burner, and has its own quiet, safe, built-in induced draft fan. Compare these COMPACT features with any other boiler in the same capacity range.

- Full 5 sq. ft. of heating surface per boiler horsepower for maximum heat transfer.
- 4-pass down draft design for high velocity gas travel and better water circulation.
- Fully automatic; firing oil, gas or both. Dependable rotary burner reduces maintenance and supervision. Insures fuel economy.
- Smaller outside dimensions allows installation in short or narrow spaces or where overhead is restricted.
- Ample clearance under drum allows easy access for installation and inspection of piping.
- Hinged or davited front and rear provides quick, easy access to tube banks for cleaning or inspection.
- Completely insulated and jacketed. Insulation extends all the way round the main drum.
- High furnace, separated from bottom of boiler by tubes of fourth pass, is safely away from "danger zone" completely eliminating bagging and blistering of furnace which results when mud builds up between bottom of boiler and furnace.

11 sizes from 20 to 200 b.h.p. for pressures to 250 p.s.i. or for hot water operation. Other Superior fire tube units are manufactured in capacities to 600 b.h.p.

Write today for Bulletin 1019C

Specialists in **PACKAGED BOILERS . . . exclusively**

SUPERIOR COMBUSTION INDUSTRIES INC.
TIMES TOWER, TIMES SQUARE, NEW YORK 36, N.Y.

SUPERIOR
PACKAGED BOILERS

Deming installation saves $30,000 on water supply for air-conditioning system

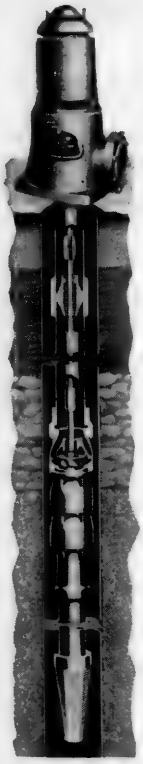


Fig. 6700 Turbine Pump for Deep Wells

From Syracuse, N. Y. comes another report on how DEMING PUMPS cut building water costs!

A graphic example of how Deming Pumps provide "profit-performance" is illustrated by a typical Deming planned installation in three multi-story buildings in Syracuse, N. Y. Over 1,500,000 gallons of water are required daily to operate the air-conditioning units in the three buildings. Alert building management consulted with their local Deming distributor in an effort to reduce the high water cost which approached $1,300 a week.

After a comprehensive survey, it was determined that underground water was available in ample volume and of desired temperature, enabling a deep well to be drilled on the property. A 25 HP Vertical Turbine Pump was recommended and installed. Compared with former water costs, the new installation is saving the company approximately $30,000 annually.

For further detailed information on the use of Deming pumps for Air Conditioning service, contact your Deming distributor or write:

THE DEMING CO.

558 BROADWAY • SALEM, OHIO

NEW CATALOGS

(Continued from page 126)

Use the prepaid postcard on last page for securing your copies of catalogs described in this department.

AIR ENGINEERING EQUIPMENT — Niagara Blower Co., New York, N. Y., has published Bulletin No. 135 on air engineering for process industries. Bulletin contains brief descriptions with use and capacity information on apparatus manufactured by the company to serve such functions as heat removal by the air method in process cooling, heat treating, vacuum distillation, refrigeration, air liquefaction, and heat and moisture control.

Circle **Item 74** on Inquiry Card

STEEL SPRING MOUNTINGS—A catalog giving the latest data on stopping vibration, shock and noise transmission by using steel spring machinery mountings is published by The Korfund Company, Inc., Long Island City, N. Y. Bulletin K3B explains clearly the reasons for using springs in controlling vibration, and describes the company's Series L Vibro-Isolators.

Circle **Item 75** on Inquiry Card

REFRIGERANT VALVES, ACCESSORIES —Henry Valve Co., Melrose Park, Ill., has issued a revised catalog, No. 103, on valves, driers, strainers and accessories for refrigeration, air conditioning and industrial applications. The catalog also describes the company's packless line shut-off valves with extended ends and solder connections, hermetic seal liquid indicators, and a new line of filter-driers.

Circle **Item 76** on Inquiry Card

ARC WELDING—Volume 14, No. 4 of Hobart Arc Welding News, a 16-page booklet of interesting photographs and articles on welding, is available from Hobart Brothers Co., Troy, Ohio. Time and money-saving applications of the technique in maintenance, production, and construction are described.

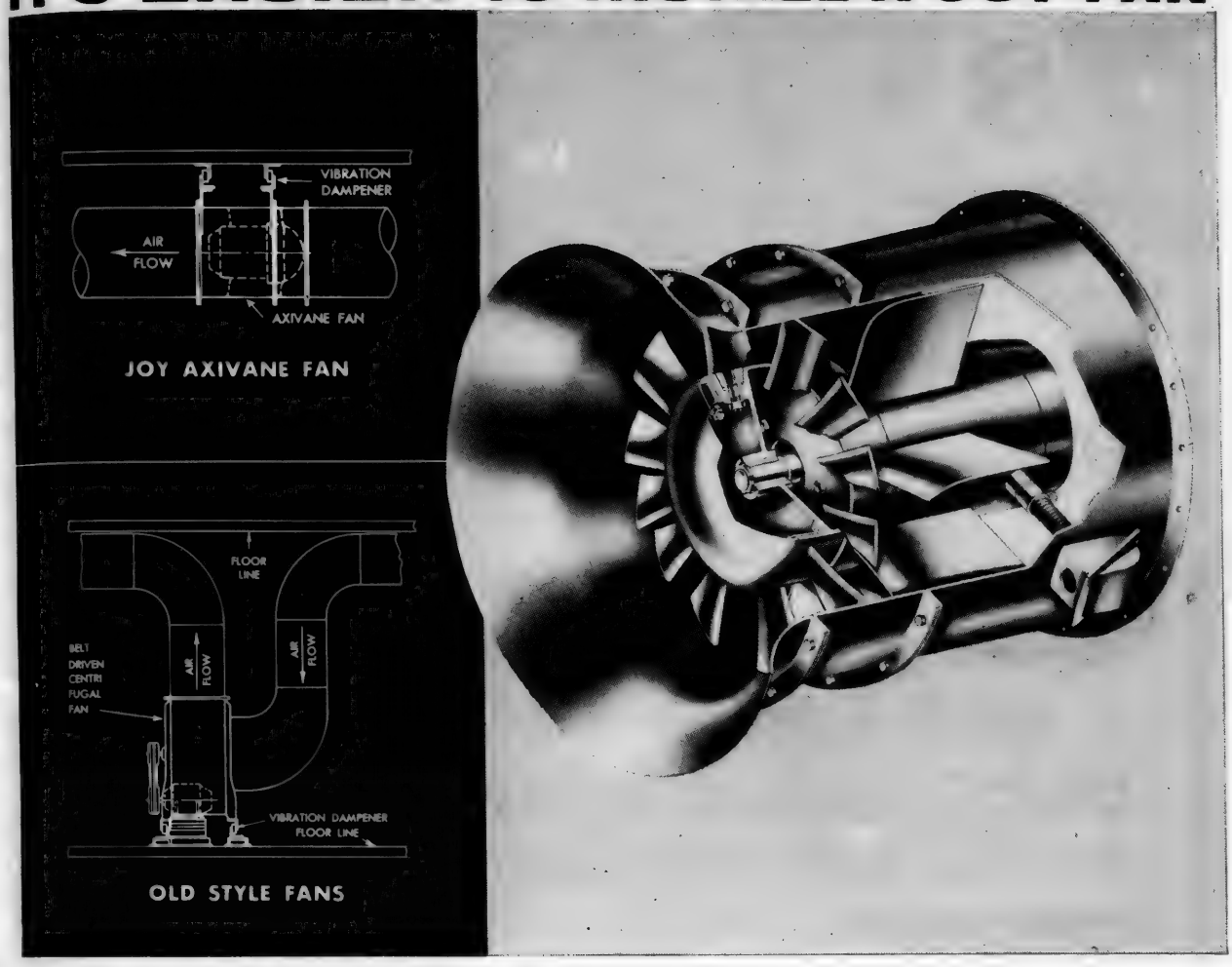
Circle **Item 77** on Inquiry Card

HERMETIC CENTRIFUGAL UNITS — A catalog designed for quick selection of hermetic centrifugal refrigerating machines made by Carrier Corporation, Syracuse, N. Y., is available for capacities from 90 to 1100 tons. Data provided for each of 28 standard models includes rating tables, compressor-motor combinations, cooler and condenser sizes with their variety of water passes, and other significant physical information. Accurate dimensions, diagrams of nozzle arrangements for heat exchangers, and current requirements are also provided.

Circle **Item 78** on Inquiry Card

(Continued on page 130)

IT'S EASIER TO INSTALL A JOY FAN



JOY FANS SAVE SPACE

simplify engineering and installation

When you install a Joy fan you install a simpler system of ventilation. The Joy fan offers high performance in a compact package. The fan fits right into the duct . . . and the motor is inside the fan.

Saves cost because the installation can be made during the fabrication of the duct system. **Saves cost** because the installation can be made by relatively unskilled labor. **Saves cost** because the duct system is simpler . . . no offsets or elbows.

Saves cost because it turns valuable space over for rental or use (value averaging $5.00 per sq. ft. per month).

Study the drawings above. Notice the efficiency and compactness of the Joy fan compared to other systems . . . then call in a Joy engineer. ***Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

WSW I 6828-199

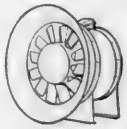
WRITE FOR FREE BULLETIN 199-40

JOY... EQUIPMENT FOR INDUSTRIAL PLANTS... FOR ALL INDUSTRY

Industrial Compressors

Conveyors

Electrical Connectors



Fans and Blowers

3 HOW TO SOLVE THE BIG PROBLEMS of Heating System Design

KEEP COSTS DOWN

The cost of Reznor unit heaters is comparable to or lower than that of other types of equipment of equal heating capacity. And with Reznor, this is the total cost. You don't have to add the costs of extensive piping and valves or duct work, and of radiators or registers. Reznor gas unit heaters produce and distribute heat at the point of need. To install them involves only suspension, venting and utility connections. So installation costs are much lower than those of central heating systems. Lower equipment cost . . . lower installation cost . . . two reasons why Reznor gas unit heaters can offer substantial savings on heating systems for so many commercial and industrial buildings.

SAVE SPACE

Reznor gas unit heaters are installed up at the ceiling, completely out of the way. When you design for a store or factory, you don't have to allot a single square foot of valuable space for heating equipment . . . and you don't have to keep floor or wall areas clear for radiators or registers.

INSURE FLEXIBILITY

When you specify Reznor gas unit heaters you don't have to choose between a heating plant which is over-sized and over-priced for current requirements and one which may not be adequate for future needs. With Reznor unit heating, when that new wing is added, additional heaters are installed. It's as simple as that. And in the case of internal remodeling, it's very easy and inexpensive to relocate the existing heaters.

ONLY REZNOR GAS UNIT HEATERS OFFER ALL THESE ADVANTAGES

- Clean, modern design, back as well as front . . . all controls and connections inside the cabinet.
- FlexiTemp control system with automatic two-speed fan control to provide nearly continuous air circulation and minimize temperature fluctuations (optional).
- No costly frills and gadgets . . . features which are needed only to meet special situations always separately listed and priced.
- Fan or blower models in ten sizes from 25 to 300 thousand BTU.

There is no "equivalent" for Reznor gas unit heaters.

REZNOR
WORLD'S LARGEST-SELLING DIRECT-FIRED UNIT HEATERS
Reznor Manufacturing Company
64 Union St., Mercer, Pennsylvania

for complete details, wherever you are . . .

Look for Reznor under "Heaters-Unit" in the Yellow Pages

NEW CATALOGS

(Continued from page 128)

Use the prepaid postcard on last page for securing your copies of catalogs described in this department.

STEAM, WATER VENT VALVES—A 12-page bulletin, No. EN-657-MV, published by Hoffman Specialty Manufacturing Corp., Indianapolis, Ind., deals with the company's main vents for steam and water systems. Included in the technical bulletin are design features, capacities, and selection tables, as well as diagrams of suggested applications for the vent valves.

Circle **Item 79** on Inquiry Card

MECHANICAL DRAFT FAN—A 4-page bulletin describing the company's forward curve mechanical draft fans for central power stations and general industrial service is announced by Chicago Blower Corp., Franklin Park, Ill. The bulletin, designated FMD-101, contains a chart illustrating the pressure characteristics of the induced draft fans. The chart demonstrates graphically the 78% peak efficiency claimed for the fans.

Circle **Item 80** on Inquiry Card

TOTALLY PROTECTED PUMP MOTORS—Totally protected pump motors, from ⅛ to 1000 hp, are discussed in 4-page Bulletin B-2507 from Reliance Electric and Engineering Co., Cleveland, Ohio. Photos and easy-to-read text explain features of the pump motors which are designed and manufactured for every pump in all types of industries. The bulletin explains the company's Partial Motor concept for attaching the machined motor frame directly to a pump frame to form an integrated unit.

Circle **Item 81** on Inquiry Card

FINNED-TUBE RADIATION—Form 1040, a 4-page folder from Schemenauer Manufacturing Corp., Holland, Ohio, describes the company's Style-Line finned-tube radiation. It includes product illustrations, dimensional diagrams, heating capacity ratings, and other information required for specifying and ordering.

Circle **Item 82** on Inquiry Card

FLUSH VALVES—Available from Sloan Valve Co., Chicago, Ill., is Catalog 60 which describes the company's lines of flush valves. Also included in the 64 pages are construction features of the various valve types, technical information, and piping data.

Circle **Item 83** on Inquiry Card

(Continued on page 132)

One of several Clarage Type XL Fans used in this application. Fan equipped with stainless steel wheel and V-belt driven from a hydraulic coupling.

Clarage Fans have what it takes

for this tough exhaust assignment in the production of titanium dioxide

Exhausting 800° F gases from rotary calciners through scrubber units and electrical precipitators to the atmosphere.

That's the demanding task this large chemical manufacturer gave Clarage Type XL Fans.

What kind of a job evaluation does Clarage receive? Several repeat orders furnish the answer. In fact, three additional Clarage Fans will soon be installed in a major expansion at this plant.

You, too, will find it pays dividends to choose the fan name of quality — Clarage. Call us in for capable assistance on your next requirements in the air handling and conditioning field. It's characteristic of Clarage equipment to prove out successfully no matter how exacting the application. CLARAGE FAN COMPANY, Kalamazoo, Michigan.

CLARAGE ... *dependable equipment for making air your servant*

SALES ENGINEERING OFFICES IN ALL PRINCIPAL CITIES • IN CANADA: Canada Fans, Ltd., 4285 Richelieu St., Montreal

for FUME

CONTROL

install

FLEXAUST®
HOSE

Made of strong neoprene coated cotton or nylon fabrics spiral wire reinforced.
For *all* kinds of fume and dust control, and ventilation uses.
Extremely flexible, durable, and lightweight.
Exceptionally easy to cut, install, connect, reuse, and relocate.
Sizes 1¼" thru 36" i.d.

Write for details today
Distributors
in all principal cities

THE FLEXAUST COMPANY
Dept. HV-3
100 PARK AVE., NEW YORK 17, N.Y.

NEW CATALOGS

(Continued from page 130)

Use the prepaid postcard on last page for securing your copies of catalogs described in this department.

PREFABRICATED SMOKE STACK — Detailed information on a permanent, low cost refractory smoke stack for commercial and industrial applications is contained in an 8-page folder available from Van-Packer Co., Division of The Flintkote Co., Bettendorf, Iowa. Subject of the folder is the company's prefabricated refractory stack, a centrifugally-cast stack available in seven diameters. The folder gives product information, applications with boilers, furnaces and incinerators, installation methods, mechanical specifications, and test data.

Circle **Item 84** on Inquiry Card

GUN-APPLIED LUBRICANT — Bulletin No. 114, covering the use of Molykote, Type BR-2, lubricant packaged in cartridges and applied from a grease gun, is published by The Alpha-Molykote Corp., Stamford, Conn. The lithium soap base heavy duty lubricant combines the excellence of calcium and sodium soap thickeners with the lubricity of molybdenum disulfide powder to insure water repellency, high temperature resistance, long storage life, and almost indestructible lubricating film characteristics. Lubricant has an operating range of minus 30 to plus 250 deg F and up to 350 deg for short periods.

Circle **Item 85** on Inquiry Card

REMOTE-TYPE CONDITIONING UNITS —A 20-page catalog, No. HC-C5, giving complete sales and engineering data on Fedair remote-type air conditioning units is published by Heating Div., Fedders-Quigan Corp., Trenton, N. J. Exploded views and individual parts, cooling and heating capacity ratings, and performance graphs provide working data. Complete data on controls and accessories are also included.

Circle **Item 86** on Inquiry Card

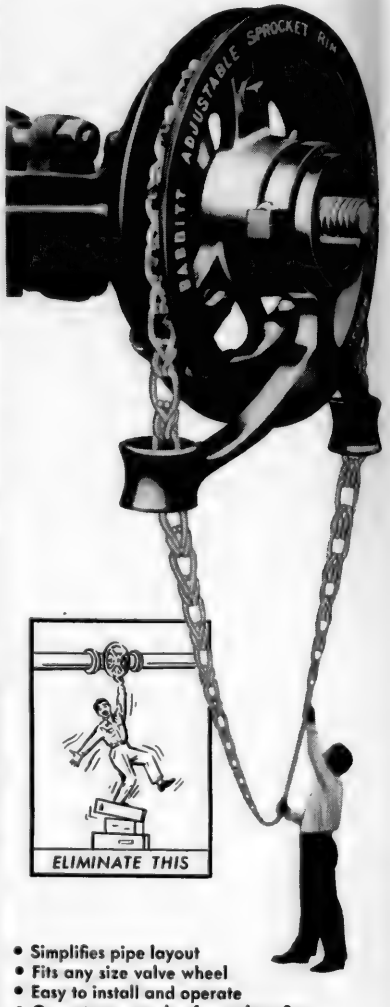
SCOTCH-TYPE BOILER—An improved model of the Fitzgibbons Scotch-type boiler is described in a catalog recently issued by the manufacturer, Fitzgibbons Boiler Co., Inc., New York, N. Y. Design, utilizing full wet back sides and top, is clearly illustrated, as well as a new arrangement of pressurized smoke-box and furnace extensions which is said to make this boiler particularly adaptable to field assembly of oil and gas fired equipment for a most efficient boiler-burner unit.

Circle **Item 87** on Inquiry Card

(Continued on page 134)

47-1

Safe, Floor Level
OPERATION
with a
Babbitt
Adjustable
SPROCKET RIM
with Chain Guide



- Simplifies pipe layout
- Fits any size valve wheel
- Easy to install and operate
- Operates any valve from plant floor
- Time and money saving fixture
- No maintenance; first cost *only* cost
- Packed, completely assembled, one to a carton
- Hot galvanized, rust-proof chain available for all sizes
- Easy to follow instructions with each unit
- Your supplier carries complete stocks
- Write for new descriptive catalog sheet and prices

Babbitt STEAM SPECIALTY CO.
BABBITT SQUARE, NEW BEDFORD, MASS., U.S.A.

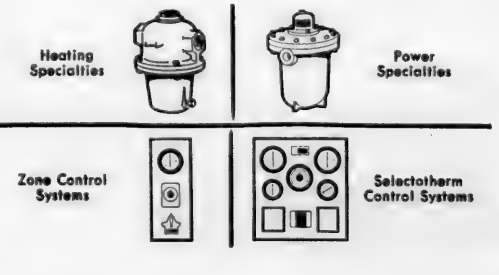
Do You Know of Any Other Steam Trap That Would Have Met This Requirement?

Here is one of nine production lines at Chris-Craft Corporation's Holland, Michigan plant. *Owners were insistent that no part of the building structure or its utilities should extend below the bottom flange of the ceiling beams.* That presented no problem for *Illinois* traps. Their unique design permitted in-line piping to Herman Nelson unit heaters (see inset) which left inches to spare! This guaranteed adequate headroom for boat masts and pulpits.

Also, Illinois traps had an outstanding durability record in prior Chris-Craft construction programs. Versatility and durability—two *good* reasons for specifying Illinois. Write for booklet, "There's a Difference in Steam Traps"—a case study at Sheaffer Pen plant.

illinois ENGINEERING

Illinois Engineering Company
2035 S. Racine Ave., Chicago 8, Ill.
A Division of American Air Filter Company, Inc.



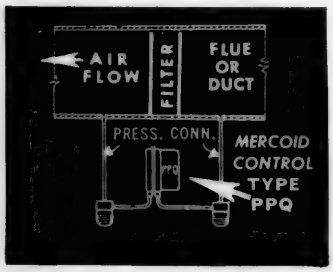
EXTREMELY
"Sensitive"
DIFFERENTIAL PRESSURE
Control
BY
MERCOID

Has Hermetically Sealed
Magnetic Mercury Switch

FOR AIR OR GAS
(INCHES OR FRACTION OF INCHES OF WATER)

For low pressure or vacuum—to "make" or "break" electrical circuits on small changes in the difference between two pressures. Examples: to indicate a change in resistance through a filter (see illustration); to indicate a change in differential due to a change in air flow conditions; to indicate interruption of air flow.

This control incorporates two pressure chambers separated by a sensitive diaphragm. Each chamber is connected to a separate pressure source and the control is set to operate as the relationship of the two pressures change.



OPERATING RANGES—6" vacuum to 6" pressure (sensitivity .03") and 30" vacuum to 30" pressure (sensitivity .1" to .2").

CIRCUIT ARRANGEMENTS—several models available to accomplish the following operations:

SPST—USING ONE MAGNETIC SWITCH—open or close switch contact either on an increase or decrease at pressure difference.

SPST—USING TWO MAGNETIC SWITCHES FOR TWO STAGE OPERATION. Open/close both switch contacts on an increase in pressure difference.

Open one contact on increasing pressure difference and one on decreasing pressure difference.

Close one contact on increasing pressure difference and one on decreasing pressure difference.

CASE STYLES—three types to meet following conditions: Indoor (general purpose), Outdoor (weather resistant), and Hazardous locations (explosion-proof).

WRITE FOR BULLETIN No. 14N

THE MERCOID CORPORATION
4211 Belmont Ave., Chicago 41, Ill.

NEW CATALOGS

(Continued from page 132)

Use the prepaid postcard on last page for securing your copies of catalogs described in this department.

CONVERSION OIL BURNERS—A new series of conversion oil burners, which feature installation ease and a high efficiency close air adjustment for all operating capacities, is described in a data sheet offered by Thatcher Furnace Company, Garwood, N. J. Complete dimensions on the seven models in the series are given. Engineering data and specifications are listed.

Circle **Item 88** on Inquiry Card

PNEUMATIC INSTRUMENTS — Catalog No. 510, published by United States Gauge, Division of American Machine and Metals, Inc., Sellersville, Pa., describes the company's complete line of indicating controllers for automatic control of pressure or temperature; transmitters for pressure or temperature indication; receiver gages in various designs, ranges, and degrees of accuracy and sensitivity. The 16-page catalog supersedes a previous catalog for these instruments, and includes the newly-added helical Bourdon tube pressure elements, and the vapor-gas and organic liquid temperature sensing systems. Tables of ranges, element characteristics, and bulb lengths are included.

Circle **Item 89** on Inquiry Card

BLOWER UNITS—Performance characteristics and important dimensions of Vari-Basic blower units in No. 916, 1020 and 1220 sizes are published in a six-page technical bulletin by Air Impeller Div., The Torrington Manufacturing Co., Torrington, Conn. A set of performance curves for each of two widths of each unit size gives static pressure and brake horsepower as functions of flow-rate output at four motor speeds. In addition, dimensional specifications for the three sizes in four discharge positions are included.

Circle **Item 90** on Inquiry Card

ADJUSTABLE RELIEF VALVES — Catalog No. 110, recently published by The Tuthill Pump Co., Chicago, Ill., describes the company's line of adjustable, spring-actuated relief valves, which are furnished in two models, each available in 6 sizes. The catalog includes performance curves, dimensions, parts specifications, cutaway drawings, and photographs of these valves. Their dependable operating and adjustment characteristics are fully explained.

Circle **Item 91** on Inquiry Card

(Continued on page 136)

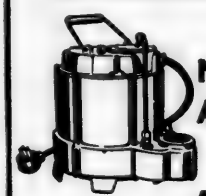
Easy To Install!

KENCO
SUBMERSIBLE PUMPS
for

WITH THE SWITCH THAT NEVER FAILS!

- Flooded Basements
- Septic Tanks
- Factory Sumps
- Transformer Vaults
- Elevator Pits
- Waste Water Disposal
- Circulating Liquids in plating tanks, machine tools, beverage coolers
- Condensate Removal in air conditioners

AA-6881



Needs No Adjusting

All Bronze Construction

COMPLETE LINE

600 to 6000 GPH

Compact

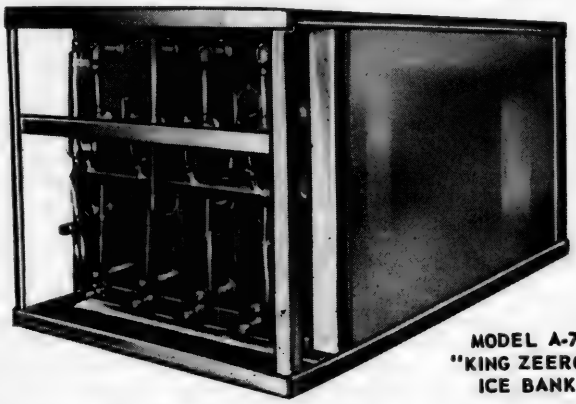
Automatic or Manual

See them at your jobbers, or write us for complete details

KENCO
PUMP DIVISION
1302 Oberlin Avenue
LORAIN, OHIO

Add a *"King Zeero"* ICE BANK to Your Refrigerating System for Effectual, Economical Air Conditioning

The "King Zeero" ICE BANK is designed to deliver 32° to 34°F. ice water for recirculation through air cooling coils in exactly the right amount when and where it is needed. It levels off "peak" and "valley" loads. Peak loads many times compressor capacity are easily handled. Ice Banks may be added to increase existing capacity. Refrigerant: Freon, Methyl Chloride or Ammonia.



MODEL A-7
"KING ZEERO"
ICE BANK

CAPACITIES - 500 lbs. to 30,000 lbs. (72,000 B.T.U.'s to 4,320,000 B.T.U.'s) in a single unit. Multiple units may be installed.

The Patented Coils with Built-in Louvres opposed to the flow of water through the ICE BANK provide turbulence. This eliminates a mechanical agitator - insures all the water rubbing all of the ice. No upkeep or repair expense whatever.

The "King Zeero" Ice Storage System of water chilling has definite advantages over direct expansion, or other types of ice accumulators.

Saves power through smaller compressor requirement. Simple construction (no moving parts). Dependable in performance. Low operating and costs.

Let the ice stored during light loads take care of peak loads. The compressor need only handle the average daily load - not the peak.

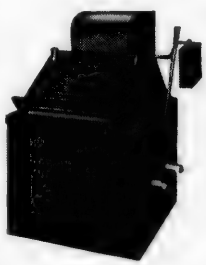
THE KING ZEERO COMPANY
4300-14 W. Montrose Ave. - Chicago 41, Ill.
Manufacturers of Ice Builders - Ice Builder Cabinets - Ice Banks

INDUSTRIAL INCINERATORS

— Save Hauling Charges

— Pay for Themselves in 6 to 12 Months!

You make good profits selling Winnen Incinerators. Almost every commercial and industrial business is a prospect. And we analyze each refuse problem for you (based on our "Survey Form") and recommend to you the right size and type of Wincinator.



Model C-10

Winnen heavy-duty incinerators burn wet refuse, dry or mixed. Your choice of fuels. No fuel needed to burn refuse 80% dry. Guillotine door is oversized for quick loading of cartons and crates.

Winnen incinerators can be installed indoors or out, take up little space. Combustion chamber is lined with heavy refractory material to withstand temperatures of 3000° F. Shell is heavy 10-gauge steel. Optional equipment is available, such as prefab chimney, automatic fuel control, etc.

All Wincinators have secondary combustion chambers and, when operated as directed, give trouble-free, smokeless-odorless service. Fully guaranteed one year.

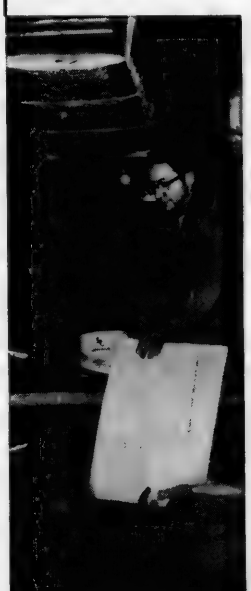
Models C and C-2 are shipped knocked down with complete, easy-to-follow directions for installing. Any handy man can set up a Wincinator. No mason needed. Easy to relocate later if you wish.

Also available is a complete line of Prefab Chimneys. Send for further information. Write today to: **Winnen Incinerator Co.**, 932 Broadway, Bedford 15, Ohio. *Advt.*

Bond Insulation *PERMANENTLY* with

ST. CLAIR

Specially Formulated Insulation Adhesives

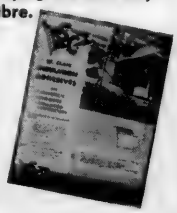


ST. CLAIR Insulation Adhesives provide excellent coverage, high heat resistance and easier handling of insulation which can be bonded immediately or up to 45 minutes after applying adhesive.

These insulation adhesives afford fine results for bonding insulation to ducts. They supersede pins and clips, wires, screws, and caps, because they save on installation cost while providing a better, neater and more permanent bond.

ST. CLAIR also produces clear and white adhesives for bonding lap seams on pipe insulation—also other adhesives for applying foil and vinyl facings to glass fibre.

Send for Free Sample & Catalog



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complete integration for

• economy • comfort • efficiency

The environmental control "package" you have been looking for.

This ceiling does the complete job of heating, cooling and ventilating with one medium—air, while providing acoustical insulation, attractive concealment for overhead services and support for recessed lights.

Economy
- Smaller ducts and fans due to a ⅓ saving in air quantities.
- Permanent aluminum ceiling finishes.
- Air diffusers eliminated.
- Rapid, *one trade* installation.

Comfort
By using only air, SIMPLEX combines:
- the speed of response of forced air systems, with
- the superior comfort of radiant heating and cooling.

Saves Space
- Smaller ducts allow shallower plenum spaces. *Saves on building height.*
- All floor space is free for use by building occupant.

Also—no SIMPLEX radiant-acoustical ceiling has ever caused condensation!

Send today for folder with complete specifications, photographs, and details. Simplex Ceiling Corp., 552 W. 52 St., New York 19, N.Y.

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Please send me folder describing the Simplex all air radiant-acoustical ceiling.
Name.....
Firm.....
Address.....
City.....Zone...State.....

NEW CATALOGS

(Concluded from page 134)

Use the prepaid postcard on last page for securing your copies of catalogs described in this department.

SHIP DEHUMIDIFICATION SYSTEMS—A 20-page bulletin, No. R-30, is available from Desomatic Products, Inc., Falls Church, Va. Entitled Ship Dehumidification Systems, bulletin is an illustrated technical paper which includes sections on automatic dehumidification systems, psychrometric ranges for these systems, and ship dehumidification methods.

Circle **Item 92** on Inquiry Card

HEAT EXCHANGERS, STORAGE TANKS—Kam Water Heater Mfg. Co., Inc., Brooklyn, N. Y., announces a 28-page catalog with full specification information on its complete line of tankless heaters, heat exchangers and storage tanks. Also described is company's accessory line of circulators, sump pumps and mixing valves.

Circle **Item 93** on Inquiry Card

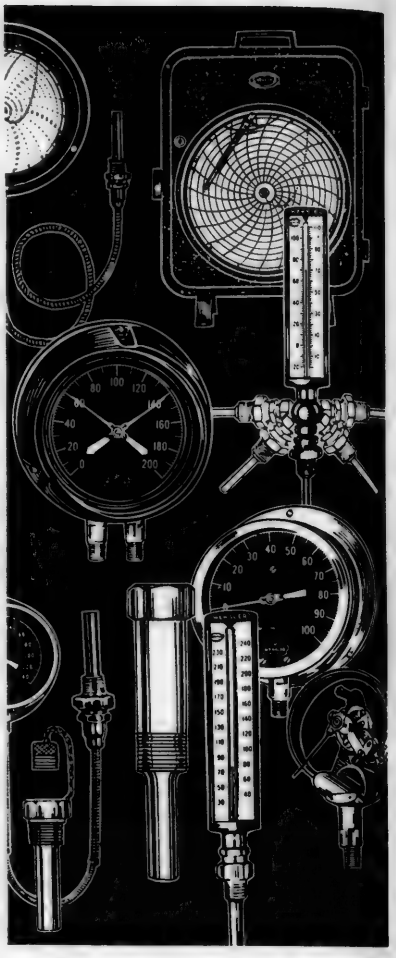
SOLUTION ACIDITY MEASUREMENT—Beckman Process Instruments Div., Fullerton, Calif.. announces an 8-page brochure entitled Industrial pH Equipment. Bulletin 5400 gives detailed descriptions and specifications of the company's industrial pH instruments, electrodes, and accessories for measurement of the acidity or alkalinity of solutions.

Circle **Item 94** on Inquiry Card

THERMOCOUPLE EXTENSION WIRES—A revised catalog, No. 32, on thermocouple wires and thermocouple extension wires, is available from Thermo Electric Co., Inc., Saddle Brook, N. J. Catalog illustrates, according to insulation and construction, the company's many available types of these wires. Listed with each type are identification symbols of the calibrations and gage sizes in which it is available.

Circle **Item 95** on Inquiry Card

FILM ON WATER CONSERVATION—Practical solutions to the problems of industrial waste and water conservation are detailed in the new motion picture, Pure and Simple, released by Public Relations Dept., Link-Belt Company, Prudential Plaza, Chicago 1, Ill. The film highlights ways in which industry, user of over 80-billion gallons of water daily, can conserve this natural resource by combatting polution, salvaging valuable by-products, re-circulating water, and treating sewage wastes. Film has a running time of 19 min, and is reserved by letterhead request for free showing to those companies or sanitary engineering organizations concerned with industrial waste problems.



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Weksler Instruments for temperature, pressure and humidity applications have been installed in literally thousands of commercial and industrial projects...routine, special, and classified.

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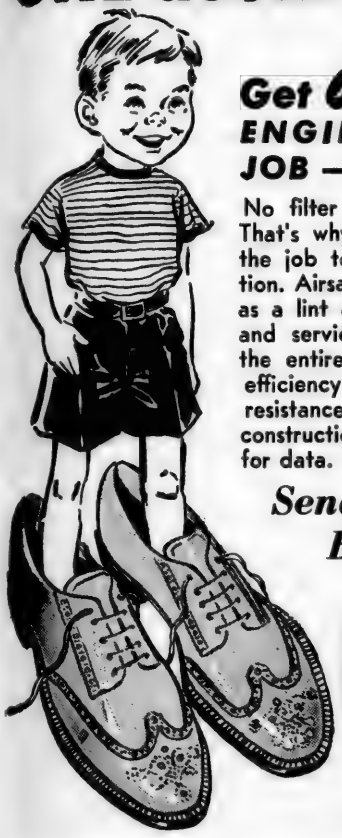
WEKSLER INSTRUMENTS CORP.
FREEPORT, L. I., NEW YORK

ONE doesn't fit ALL needs!



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ENGINEERED TO FIT THE JOB — RIGHT EVERY TIME

No filter does all jobs, meets every need. That's why Airsan Filters are engineered to the job to offer more effective dust collection. Airsan's expanded metal face plate acts as a lint arrestor to provide easier cleaning and servicing. It distributes air easily over the entire filter area. Provide high filtering efficiency and dust holding capacity with less resistance. Features include all galvanized construction and welded lock corners. Write for data.

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AFI MEMBER AIR FILTER INSTITUTE

AIR FILTERS
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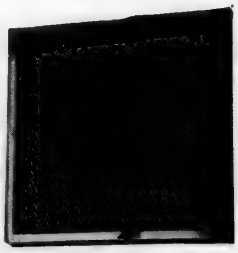
Viscous type, permanent and cleanable designed for industrial, commercial and domestic use. Available in 1" and 2" thickness.



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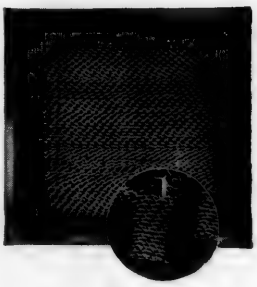
(High Velocity)

Has a specially designed high velocity Viro-Crimp filter core. Hemmed edges provide a safety feature. Operates efficiently at 300 to 500 fpm. Available in 2" and 4" thickness.



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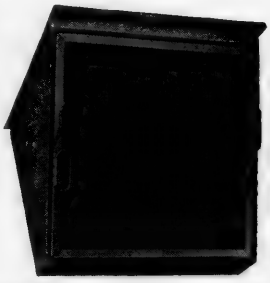
Permanent, cleanable type Airsan Grease Filters made especially for range canopies, galleys, kitchens. Available in 2" thickness.



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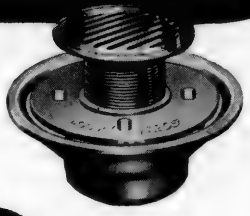

1205 RAM

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The Boosey line offers you a custom selection of over 400 floor drain variations to assure you of the exact drain for the job. Basic drain options include backwater floor drains with deep seal traps, standard floor drains — and even drains for window aquariums. All of these drains are made to Boosey quality control standards and are available in a complete range of sizes to meet every requirement.

If you don't have Boosey's catalog B-49-CI, Floor Drains and Auxiliary Fittings, write for it today.

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Designed for testing boilers, condensers, heat exchangers, pressure vessels, and pipe lines simple construction requires minimum maintenance. Horizontal lift type bronze valves can be reground without removing from pump. Higher pressure pump is all bronze with stainless steel piston. Write for literature on pumps to 10,000 psi.

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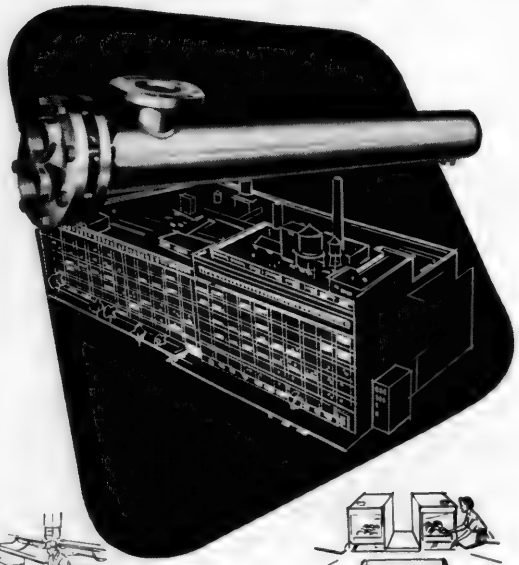
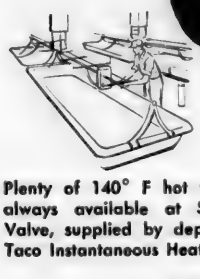
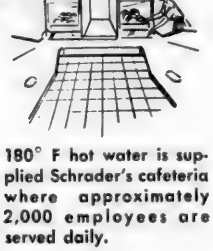
How would you heat 100,000 GALLONS of water daily?





Plenty of 140° F hot water is always available at Schrader Valve, supplied by dependable Taco Instantaneous Heaters.



180° F hot water is supplied Schrader's cafeteria where approximately 2,000 employees are served daily.

Here's how Schrader Valve Company does it!

They use 5 Taco Instantaneous Heaters. Every day of the year these 5 Tacos heat 100,000 gallons of water with 5 lb. live steam to 140° or 180°F. All Schrader hot water requirements . . . and there are *many* . . . are amply met by rugged, trouble-free Tacos *without a major repair in 18 years.*

Proof that you can depend on Taco to solve your hot water problem quickly, efficiently and economically. Mail coupon for Simplified Selection Chart today.

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BOOK REVIEWS

Publications abstracted in this department should be ordered direct from publisher

INTRODUCTION TO HEAT TRANSFER

First published in 1942, Introduction to Heat Transfer by Aubrey I. Brown and Salvatore M. Marco, professors of mechanical engineering, The Ohio State University, has just been issued as a third edition. It is written to be used and understood by third or fourth year engineering students. Most of the material has been used with satisfactory results in a course for third-year mechanical students at the university, following a course in fluid mechanics and several courses in heat power.

The third edition includes two new chapters—one on Fluid Flow in the Convection Process, and one on Graphical and Numerical Methods for Heat Conduction Problems. There is also new material on fundamental units, and a new section on Design of Electrical Transformers.

Some of the chapters include heat transfer by conduction; equations for the calculation of conduction heat transfer; radiation; fundamental units and dimensional analysis; fluid flow in the convection process; forced convection; free or natural convection; heat transfer to boiling liquids; condensing vapors; applications of the principles of heat transfer to design problems; transient conduction; graphical and numerical methods for heat conduction problems.

Introduction to Heat Transfer by A. I. Brown and S. M. Marco. Cloth bound, 6 by 9 inches, 332 pages. Published by McGraw-Hill Book Company, 330 W. 42nd St., New York 36, N. Y. Price, $6.75.

PUMP OPERATION AND MAINTENANCE

Having as an objective to help every engineer, foreman and mechanic who is charged with pump operation and is concerned with a reduction in pump maintenance costs, Tyler G. Hicks, has assembled a great deal of valuable technical information. This is available in his book, Pump Operation and Maintenance. The author is an editor of industrial and engineering books for the McGraw-Hill Book Company and an instructor in mechanical engineering at Cooper Union School of Engineering.

The book is divided into three parts. The first covers centrifugal pumps with six chapters devoted to installation, operation, trouble shooting and maintenance of these pumps. Starting with the arrival of the pump in his plant, the reader is taken, step by step, through the various phases of installation, operation and maintenance.

The second and third parts of the book cover rotary and reciprocating pumps. Full, accurate and simple instructions and illustrations are given for the installation, operation and maintenance of a wide variety of modern pumps of these types. The last chapter of the book is devoted to pump maintenance control.

Pump Operation and Maintenance, by T. G. Hicks. Cloth bound, 6 x 9 inches, 310 pages. Published by McGraw-Hill Book Company, Inc., 330 W. 42nd St., New York 36, N. Y. Price, $9.

TECHNICAL WRITERS

to hold annual institute. Week-long workshop will cover books, manuals, sales, and magazine writing.

Eight technical writing authorities from national business and industry will survey all phases of technical communication at the 6th Annual Technical Writers' Institute to be conducted at Rensselaer Polytechnic Institute, Troy, N. Y., from June 9-13, 1958. The week-long workshop, directed by Prof. Jay R. Gould, will be staffed by nine lecturers from Rensselaer's faculty in language and literature.

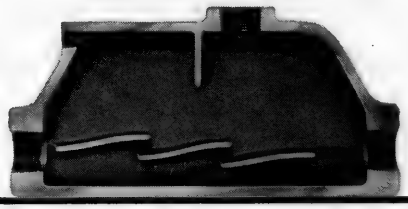
More than 400 representatives of 200 large companies have attended the previous annual sessions of the Technical Writers' Institute. The intensive Monday-through-Friday seminar is designed to give guidance to those who supervise technical writing, to those newly entering the field, and to those already established.

• **SPECIAL LECTURERS**—The special lecturers of the Sixth Institute will include: Benjamin B. Schaeffer, supervisor of technical publications, Olin Mathieson Chemical Corp.; Robert E. Speers, editorial advisor, Engineering Research Laboratory, the du Pont Company; S. J. Goodman, manager Technical Publications Department, Aircraft Radio Corp.; Joseph C. Hoffman, manager of product information, General Electric Co., Philadelphia; Carroll A. Nolan, chairman, Department of Business Administration, Syracuse University; Howard J. Constantin, publications section head for illustrations, Sperry Gyroscope Co.; Hugh T. Sharp, promotion manager, *Chemical Engineering* Magazine; and William L. Millard, assistant professor of audio-visual education, R.P.I.

Canadian Degree-Days for January, 1958*

City	January		Cumulative	
	1958	Normal	1957-58	Normal
Calgary, Alta.	1150	1530	4659	5190
Charlottetown, P. E. I.	1167	1460	3700	4310
Crescent Valley, B. C.	1092	1360	4188	4580
Edmonton, Alta.	1429	1780	5131	5850
Fort William, Ont.	1630	1830	5393	5790
Grande Prairie, Alta.	1592	1820	5718	6120
Halifax, N. S.	1015	1262	3101	3775
London, Ont.	1284	1320	3881	4000
Medicine Hat, Alta.	1169	1590	4320	5000
Moncton, N. B.	1225	1520	3939	4620
Montreal, P. Q.	1409	1590	4037	4630
North Bay, Ont.	1602	1710	4951	5330
Ottawa, Ont.	1477	1640	4272	4850
Penticton, B. C.	922	1190	3396	3780
Prince George, B. C.	1116	1570	4607	5330
Quebec City, P. Q.	1459	1690	4554	5150
Regina, Sask.	1510	1940	5511	6090
St. John, N. B.	1203	1440	3826	4570
Saskatoon, Sask.	1568	1990	5600	6240
Timmins, Ont.	1759	1990	5701	6190
Toronto, Ont.	1222	1249	3487	3771
Vancouver, B. C.	689	890	2696	3010
Victoria, B. C.	645	800	2541	2770
Windsor, Ont.	1183	1220	3483	3660
Winnipeg, Man.	1690	1993	5523	6023

*These data are supplied through the courtesy of the Meteorological Division Air Service Branch, Department of Transport, Canada.



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2. Central Methodist Church
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4. Central Medical Bldg.
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7. Rose Lane School
8. Madison School No. 5
9. Madison School No. 6
10. St. Joseph Nurses Home
11. First National Bank, Thomas & Central Branch
12. Egyptian Motel
13. Sands Motel
14. Highway House Motel
15. Valley Ho Motel, Scottsdale
16. Down Town Motel
17. Motorola Research Lab.
18. Motorola Western Electronic Center
19. Republic & Gazette Newspaper
20. Arizona State Hospital
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The Burst-At-The-Seams activity that is today's Phoenix, Arizona, can best be measured by these diversified Drayer-Hanson air conditioning installations, recently sold by the E. B. Bomar organization, 914 W. Madison Street, Phoenix . . .

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LOS ANGELES 63, CALIFORNIA
CABLE FORTRADE LOS ANGELES

Noise Transmission in Pipe

(Concluded from page 99)

In addition, the piping should not be installed too close to any wall or structural member. If the piping is installed too close in any of these instances, any movement of the piping will cause it to rattle or vibrate against the other piping or parts of the building and thus create noises that are transmitted through the distribution system.

Similar consideration must be extended to the piping risers where two lines can rattle or vibrate against each other if they are installed too close. In tall buildings, sufficient attention must be given to the expansion in the piping to avoid the occurrence of noise.

Small diameter branch piping requires special attention to ensure that it will not create a noise condition. This piping will move considerably with the passage of the water through the piping and the closure of the faucets or valves. Therefore, it should be carefully supported and spaced far enough apart from other piping or building construction against which it can rattle or vibrate.

Summary

As a review, some of the steps that should be taken to avoid the transmission of noise in a piping system include:

Water hammer arrestors should be properly located to absorb the shock of water hammer.

Loose faucet or valve washers should be tightened.

Horizontal branch lines should be adequately supported to prevent piping noises.

Riser piping should be adequately spaced and supported to prevent piping noises.

Water distribution system should be adequately sized for building water demand.

Water mains should be adequately spaced and supported to prevent piping noises.

Expansion devices should be considered for mains and risers to limit movement of piping.

Pressure reducing valves should be utilized to control excessive water pressures.

Flexible connections should be used with pumps or equipment that vibrates in operation.

Specify quality valves, piping and devices to insure a good water distribution system.

COMING EVENTS

Where listed, names or titles of individuals are those from whom further information is available

AIF ATOMIC EXPOSITION—AIF AtomFair exhibition, at the Chicago Amphitheatre, Chicago, Ill., sponsored by American Institute of Chemical Engineers. Secretary of the Institute, 25 W. 45th St., New York 36, N. Y. . . . . **MARCH 17-21, 1958.**

NACE CONFERENCE—14th annual conference of the National Association of Corrosion Engineers, at the Civic Auditorium, San Francisco, Calif. A. B. Campbell, executive secretary of the Association, 1061 M & M Bldg., Houston 2, Texas. **MARCH 17-21, 1958.**

NUCLEAR CONGRESS—1958 Nuclear Engineering and Science Conference in Chicago, Ill. Engineers Joint Council, 29 W. 39th St., New York 18, N. Y. . . . . **MARCH 17-21, 1958.**

NEW ENGLAND GAS MEETING—Annual meeting of the New England Gas Association, at the Hotel Statler, Boston, Mass. Clark Belden, managing director of the Association, 10 Newbury St., Boston 6, Mass. ..... **MARCH 20-21, 1958.**

POWER CONFERENCE—20th anniversary meeting of the American Power Conference, at the Hotel Sherman, Chicago, Ill. R. A. Budenholzer, mechanical engineering department, Illinois Institute of Technology, 3300 Federal St., Chicago 16, Ill. . . **MARCH 26-28, 1958.**

GAMA MEETING—Annual meeting of the Gas Appliance Manufacturer's Association, at The Greenbrier, White Sulphur Springs, W. Va. Secretary of the Association, 60 E. 42nd St., New York 17, N. Y. ..... **MARCH 31-APRIL 2, 1958.**

BRI MEETING—Seventh annual meeting of the Building Research Institute, at the Shoreham Hotel, Washington, D. C. C. R. Koehler, Publicity, BRI, 2101 Constitution Ave., Washington 25, D. C. ..... **APRIL 21-23, 1958.**

AIHA CONVENTION—19th annual meeting of the American Industrial Hygiene Association at the Claridge Hotel, Atlantic City, N. J. G. D. Clayton, executive secretary, 14125 Prevost, Detroit 27, Mich. ..... **APRIL 21-26, 1958.**

AIR-CONDITIONING AND REFRIGERATION MEETING—Annual meeting of the Air-Conditioning and Refrigeration Institute, at The Homestead, Hot Springs, Va. Secretary of the Institute, 1346 Connecticut Ave., N.W., Washington 6, D. C. ..... **MAY 4-7, 1958.**

LPGA CONVENTION—27th annual convention and trade show of the Liquefied Petroleum Gas Association, at the Conrad Hilton Hotel, Chocago, Ill. Secretary of the Association, 11 S. LaSalle St., Chicago 3, Ill. ..... **MAY 4-7, 1958.**

WORLD TRADE FAIR—1958 United States World Trade Fair to be held at the New York Coliseum, New York, N. Y. D. J. Jacobson, United Public Relations, Inc., 120 E. 56th St., New York 22, N. Y. ..... **MAY 7-17, 1958.**

MECHANICAL CONTRACTORS CONVENTION—69th annual Convention of the Mechanical Contractors Association of America, Inc., at the Ambassador Hotel, Los Angeles, Calif. L. B. Gruman, executive secretary of the Association, Suite 570, 45 Rockefeller Plaza, New York 20, N. Y. ..... **MAY 20-23, 1958.**

INDUSTRIAL RESEARCH CONFERENCE—Ninth annual Industrial Research Conference at Arden House, Columbia University, New York, N. Y. R. T. Livingston, director, Columbia University, 409 Engineering Building, New York 27, N. Y. ..... **JUNE 1-6, 1958.**

NDHA CONVENTION—49th annual meeting of the National District Heating Association, at the French Lick-Sheraton, French Lick, Inc., J. F. Collins, Jr., secretary of the Association, 827 N. Euclid Ave., Pittsburgh 6, Pa. ..... **JUNE 2-6, 1958.**

OIL HEAT EXPOSITION—2nd Oil Heat and Air Conditioning Exposition at the New York Coliseum, New York. C. H. Pesterfield, secretary, Oil Heat Institute of America, Inc., 500 Fifth Ave., New York 36, N. Y. ..... **JUNE 9-12, 1958.**

ASTM MEETING—Annual meeting of the American Society for Testing Materials, at the Hotel Statler, Boston, Mass. Secretary of the Society, 1916 Race St., Philadelphia 3, Pa. . . **JUNE 22-27, 1958.**

JOINT ASHAE-ASRE MEETING—Joint summer meeting, American Society of Heating and Air-Conditioning Engineers and American Society of Refrigerating Engineers. Hotel Leamington, Minneapolis, Minn. A. V. Hutchinson, secretary of the ASHAE, 62 Worth St., New York 13, N. Y., and Secretary of the ASRE, 234 Fifth Ave., New York 1, N. Y. ..... **JUNE 23-25, 1958.**

REFRIGERATION WHOLESALERS MEETING—Annual meeting of the Air-Conditioning and Refrigeration Wholesalers, at the Sheraton-Palace Hotel, San Francisco, Calif. Secretary of the Institute, 2607 N. High St., Columbus, Ohio. ..... **OCTOBER 22-24, 1958.**

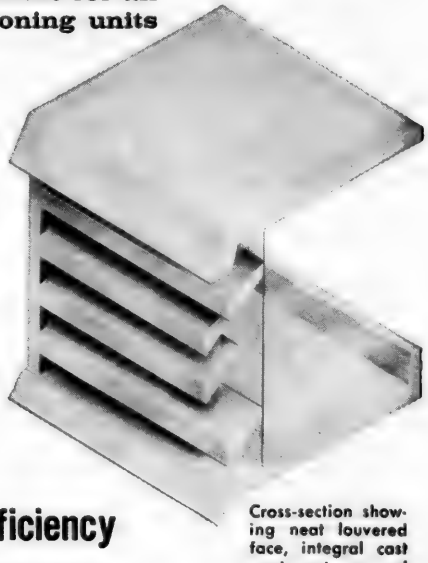
EXPOSITION AND ASHAE CONVENTION—65th annual meeting, American Society of Heating and Air-Conditioning Engineers (Jan. 26-29, 1959) and 14th International Heating and Air Conditioning Exposition, Philadelphia, Pa. A. V. Hutchinson, secretary of the Society, 62 Worth St., New York 13, N. Y. . . **JANUARY 26-30, 1959.**

ARI EXPOSITION—11th Exposition of the Air-Conditioning and Refrigeration Industry at Convention Hall, Atlantic City, N. J. Geo. S. Jones, Jr., managing director of Air-Conditioning and Refrigeration Institute, 1346 Connecticut Ave., N. W., Washington 6, D. C. ..... **NOVEMBER 2-5, 1959.**

C-S

modular brick size vents

ideal air intake for all air conditioning units



Cross-section showing neat louvered face, integral cast waterstop and screening.

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weatherproofness
economy

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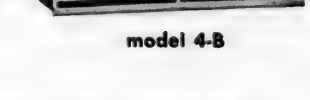

model 4-B

Write today for complete specification information, sizes, free areas, finishes, ducts, grilles, registers.

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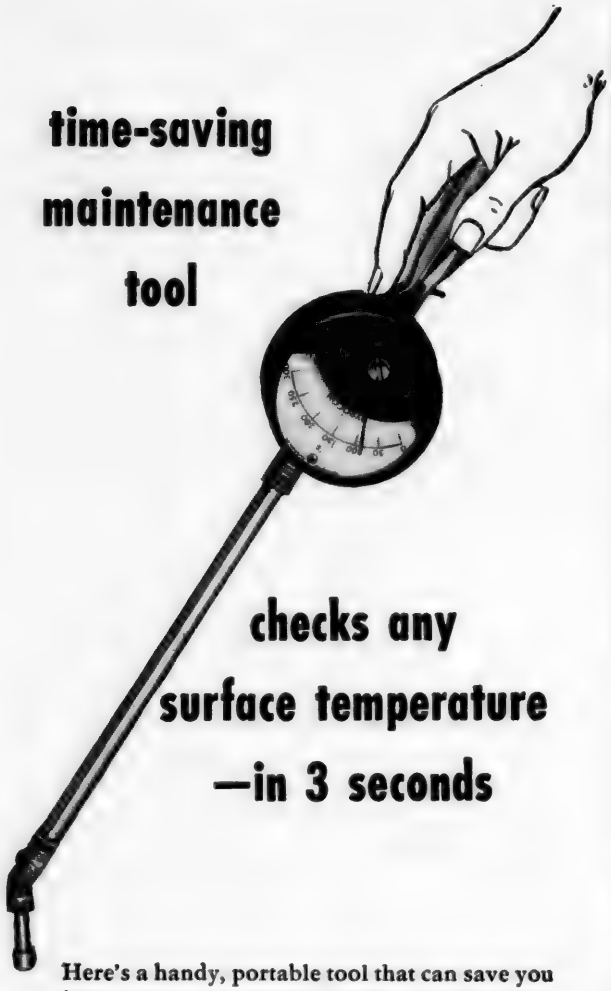
Please send me complete information on

☐ specifications ☐ prices ☐ technical data
☐ finishes ☐ accessories.

Name_____ Position_____
Firm_____ Address_____

time-saving maintenance tool



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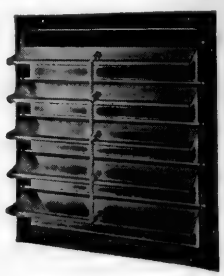

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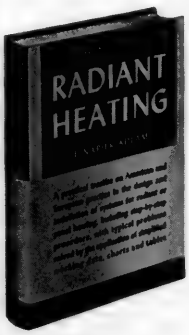

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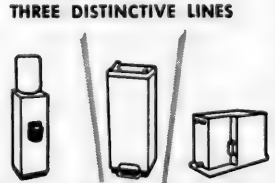

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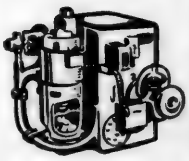

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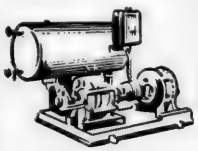
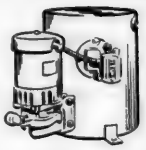


TYPES B and C

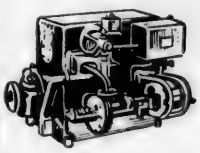


TYPE MR

TYPE S

SDV

SCC



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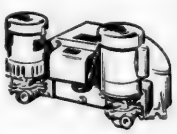

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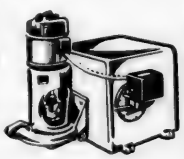

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For condensate pumps of special capacities or discharge pressures, see your Wheeler-Economy representative or write direct.

Wheeler-Economy invites you to compare its pumps with any others on the market! Many have heavy, close-grained cast iron receivers, and are either flexible-coupled or close-coupled. Others—priced appreciably lower—have steel receivers and are close-coupled.

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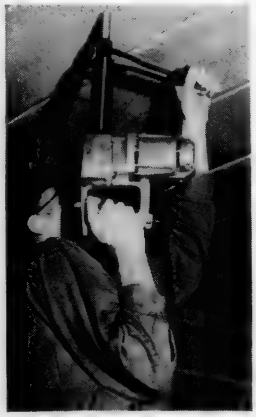

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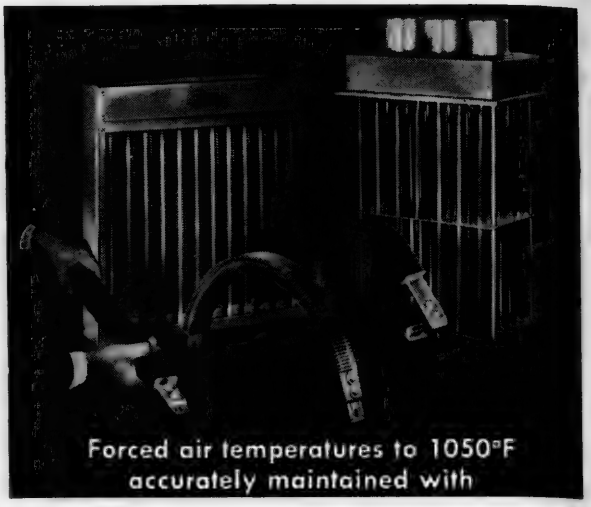

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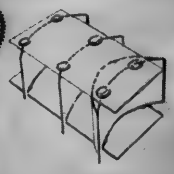

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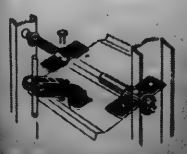

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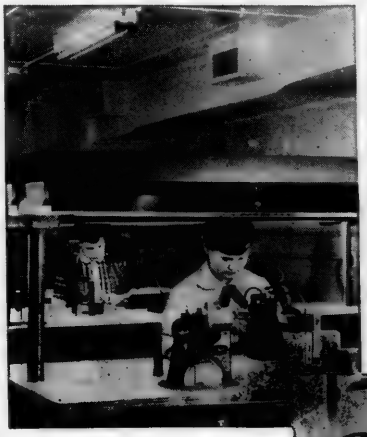

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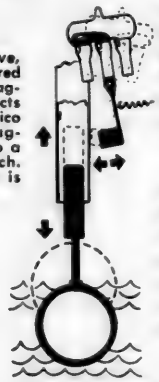

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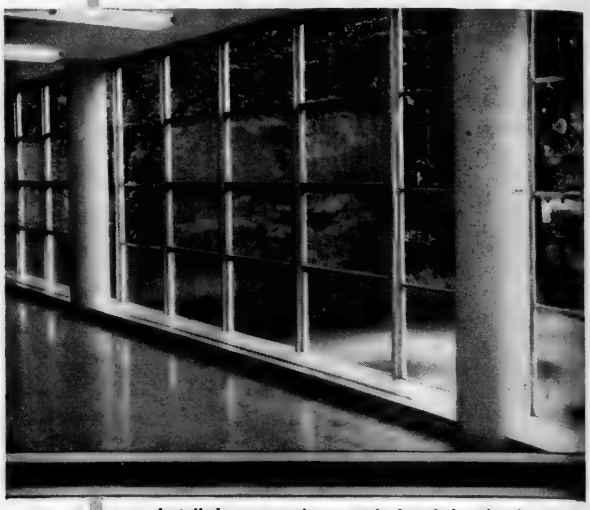

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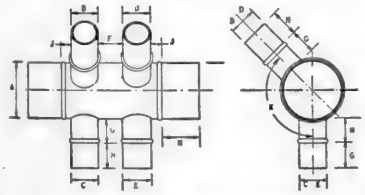

3 SOUND ABSORBERS
HIGH PRESSURE
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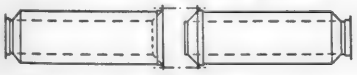

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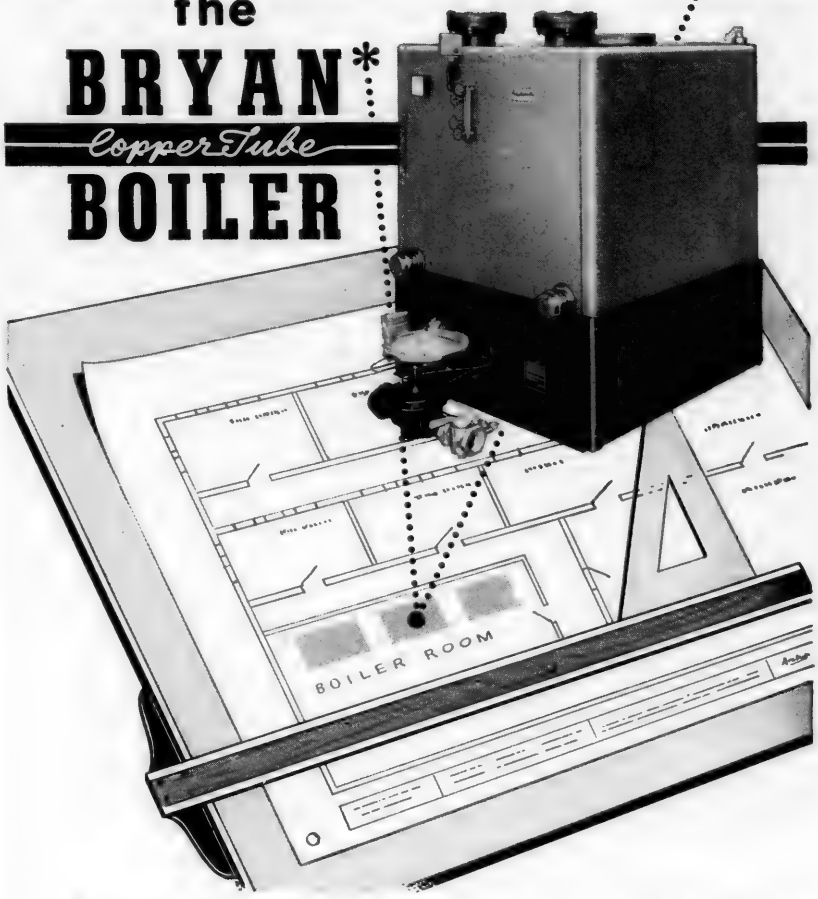

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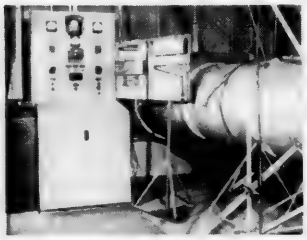

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for observing and recording operating characteristics of fans being tested in chamber shown at top.

OUTDOOR LABORATORY

for confirming of wind tunnel tests and performance data, and conducting endurance test programs.

Aerovent builds fans for every type of industrial application, in sizes from 9" to 96", and capacities to 145,000 CFM. Large propellers for cooling towers and heat exchangers in diameters to 18 feet.

WORLD'S LARGEST exclusive manufacturers of industrial air-moving equipment!

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Certified Ratings

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Ash and Brandt Sts. Piqua, Ohio

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THERMOTROL

for ACCURATE, INDEPENDENT ROOM TEMPERATURE CONTROL

STEAM *or* HOT WATER SYSTEMS

. . . for modernization or new construction

CAN BE KEY LOCKED

for . . . HOSPITALS, APARTMENTS, OFFICES, HOTELS, SCHOOLS, MOTELS, INSTITUTIONS and PUBLIC BUILDINGS

- **COMPLETELY SELF-CONTAINED**
  Each Sterlco Thermotrol is a complete temperature control unit, easily installed in any two-pipe system in place of the manual valve. NO wiring or other external connections needed.
- **MODULATING CONTROL—NOT *on* AND *off***
  Each Sterlco Thermotrol provides steady, even control to each radiator the way YOU want it. Radiators in cold spots give off heat while those in warmer parts of the same room are automatically throttled down.
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  No electric wiring, additional piping, or other connections are required with the Sterlco Thermotrol. Just as easily installed for modernization as for new construction.

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Here's modern ZONE CONTROL for radiant systems. The only modern solution to inefficient "on-off" valves and expensive, motorized valves.

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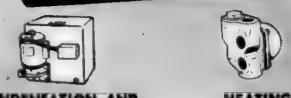
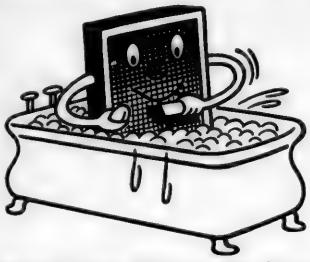


CONDENSATION AND VACUUM PUMPS | HEATING SPECIALTIES | TEMPERATURE CONTROLS

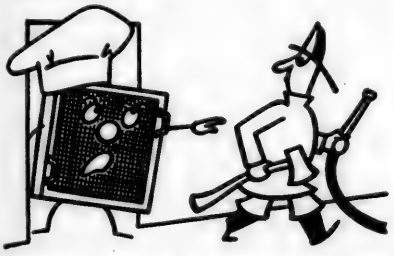
AIR-MAZING FACTS

BY O. SOGLOW

DUST ELECTROCUTES WHEAT! In the Dust Bowl era, winds have been known to blow dust together with such force that it created static electricity which burned the tops of wheat and other plant life! But electricity makes dust behave when you use an Electromaze electronic air filter.



NEW FILTER TAKES ITS OWN BATH! Automaze automatic air filters stay clean by continuously taking a bath. Endless belt of filter panels rotates through a cleaning tank to clean panels thoroughly and renew adhesive automatically. Goes 3 to 6 months without attention.



KEEPS FIREMEN OUT OF KITCHENS! Air-Maze Greastop filters snatch dirt and grease droplets out of the air, help to prevent fire hazards in commercial kitchen exhaust ducts. It's one of hundreds of filter types designed by Air-Maze—*the filter engineers.*

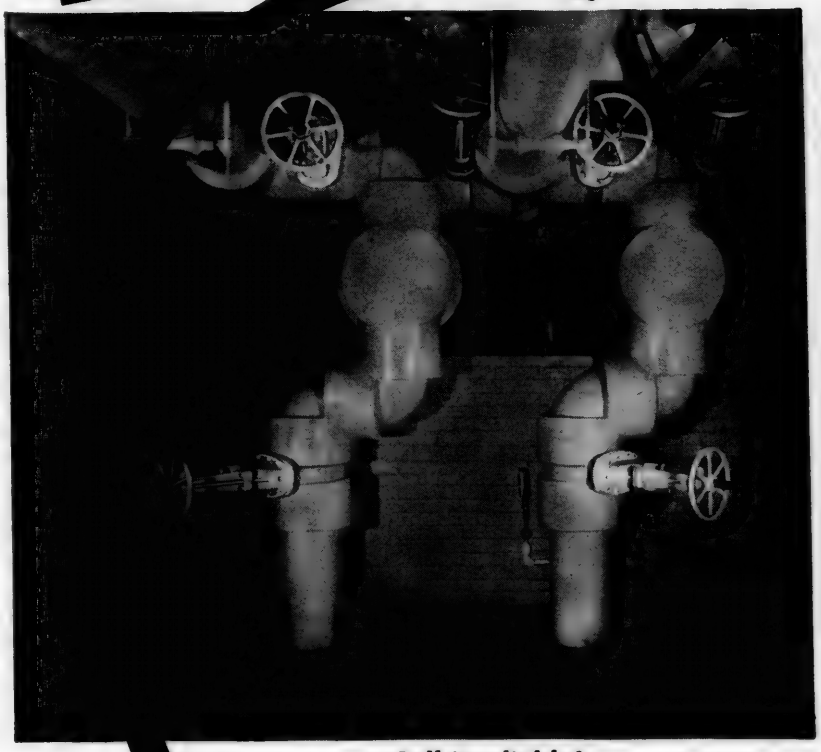
FOR AIR CONDITIONING AND VENTILATING EQUIPMENT, ENGINES, COMPRESSORS *or any device using air or liquids*—there is an Air-Maze filter engineered to solve each filtering problem. For new all-line catalog, write Air-Maze Corporation, Dept. A-3, Cleveland 28, O.

AIR-MAZE

The Filter Engineers

AIR FILTERS • SPARK ARRESTERS • LIQUID FILTERS SILENCERS • OIL SEPARATORS • GREASE FILTERS

Proved DEPENDABLE



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- **Call it dependable!**
- **If it is a Fairbanks valve . . . it has it!**

Thousands of installations under every condition from the simplest to the most difficult, prove Fairbanks valves give dependable service, require less maintenance, last longer — often succeed where other valves fail!

That is why you find more uninterrupted service, less shutdown, in plants that specify Fairbanks 125-pound Iron Body Gate Valves — the valves with proven dependability built in!

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(*ALL IRON GATE VALVES ALSO AVAILABLE.)

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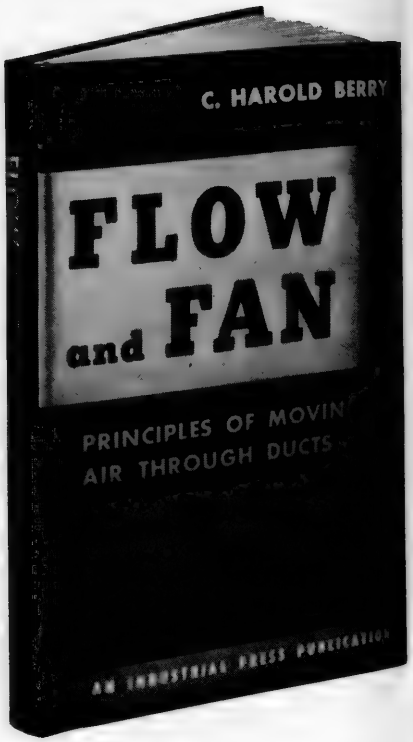
393 LAFAYETTE STREET, NEW YORK 3, N. Y.

Branches: New York 3 • Pittsburgh 22 • Boston 10 • Rome, Ga.

TRUCKS • CASTERS • DART & PIC UNIONS • VALVES

To help you solve your problems . . .

A BASIC TEXT ON AIR HANDLING



Eminently readable!

Practical!

Comprehensive!

"Flow and Fan" will help you solve your problems of moving air through ducts, and the selection and control of fans. It covers the *how* and *why* behind the basic calculations in the design of systems, giving information that is applicable to the actual problems you meet in ventilating work.

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The author possesses both engineering and teaching experience; and in addition he has the rare ability to write entertainingly about a technical subject without over simplification, but with practical attention to the limits of engineering accuracy.

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Fan and System

Selecting a Fan

Fan Selection and Rating

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232 Pages
84 Illustrations

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THE INDUSTRIAL PRESS, 93 Worth St., New York 13, N. Y.

Please send me a copy of "Flow and Fan."

☐ Check or money order enclosed. Send book postpaid.

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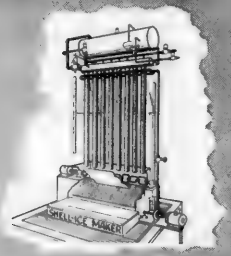
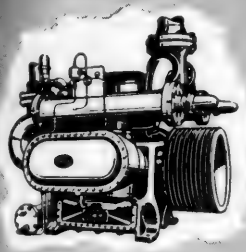


- AIR CONDITIONING SYSTEMS
- CONDENSERS
- AIR COOLING UNITS
- CONTROLS, VALVES & FITTINGS

- ICE-MAKING SYSTEMS
- SHELL-&-TUBE & COIL COOLERS
- QUICK-FREEZING SYSTEMS
- LOW PRESSURE REFRIGERATION UNITS



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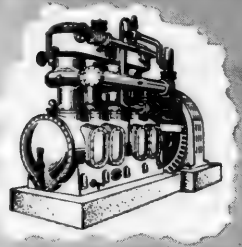
If you need any type of commercial or industrial cooling . . . call your nearest Frick Branch Office or Distributor for recommendations and estimates.



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FRICK CO.
WAYNESBORO, PENNA., U. S. A.

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- HEAVY-DUTY COMPRESSORS

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SITUATION WANTED

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WANTED

Research & Development Engineer: for a well known Manufacturer of heating and air conditioning equipment. Age 25 to 50. Minimum of 5 years experience required. Opportunity to advance in Executive Engineering. Send complete resume, including salary requirements, to V. L. Miller, Personnel Manager.

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812 So. Theresa, St. Louis, Mo.

FOR SALE: Oil Burner Manufacturing business —two models—capacities 1 to 9 GPH,—home and light industrial uses. If interested write Box No. 917, Air Conditioning, Heating & Ventilating, 93 Worth St., New York 13, N. Y.

PRINTED FORMS available for immediate shipment. Heating & oil burner materials form, burner service record cards, service order forms, inspection information form, survey sheet and others. Also can supply BURNER SERVICE form in 8 part EZE-SNAP with 2 carbons in each set, 1200 sets IMPRINTED with your name, address and telephone, only $20.40. Send for samples—no obligation. Write Dept. AC, Degree Day Systems, 39-30 58th St., Woodside 77, N. Y.

HEATING AND VENTILATION ENGINEER

One of the most prominent commercial printing organization in the country offers an outstanding opportunity in its Manufacturing Division to an engineer familiar with the problems of combustion engineering. He should have the ingenuity to apply this theoretical knowledge to technical problems relative to heating, ventilation and air flow control on high speed automatic equipment. Qualifications: Graduate Engineer, 1 to 2 years of related experience. Age 25-30.

Please send details of your education and experience to Glen D. Smith, R. R. Donnelley & Sons Company, 350 East 22nd Street, Chicago 16. All applications will be treated in strict confidence.

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AND PRODUCT INFORMATION SERVICE

Below and on the following pages are given brief digests of the advertisements appearing in this month's issue. Use this Digest to locate and refer to the advertisements in which you are particularly interested, then fill out and mail the prepaid postcard to request further information from manufacturers.

The items appear in the same order as the advertisements to which they refer, to facilitate obtaining further information after reading an advertisement.

NOTE: All advertisements are digested here except those received too late for inclusion. The Index of Advertisers lists all the advertisements in this issue.

Use the postcard below for catalogs, new equipment and materials, as well as Ad-Digest items.

RATED RELIEF VALVE.....
for temperature and pressure relief meets all domestic and many other needs. No other valve of equal quality or capacity is obtainable at such an attractive price. Information is available.
Inside Front Cover — Item 200

UNIT TRAPPING.....
is subject of this ad which presents theory, practice and proof of unit trapping for top temperatures. 44-page steam trap book is available as well as reprint of article on unit trapping.
Page 1 — Item 201

SPACE HEATER.....
with company's special burner will handle all grades of No. 5 oil efficiently and dependably. The dual pre-heating system brings hot oil up to the tip of the nozzle. Bulletin is available.
Page 2 — Item 202

HEAVY DUTY FANS.....
provide the big performance required by present day air handling problems because of their adaptability to an extremely wide variety of design requirements over a broad range of application. Bulletins are available.
Page 5 — Item 203

NEW WROUGHT IRON.....
has emerged from the manufacturer's laboratory and into production for even better corrosion control. Complete details are available.
Page 9 — Item 204

DIAPHRAGM TYPE FLUSH VALVES..
insure a future of faultless service for the Atlas Building in the ancient South American city of Lima, Peru. Information is available.
Page 11 — Item 205

COPPER TUBE FITTINGS.....
and valves are described in this manufacturer's catalog, which is available, listing the most complete range of fittings for use with copper tube.
Page 13 — Item 206

CENTRIFUGAL PUMPS.....
available from stock give years of trouble-free service. Most commonly used sizes are ready for immediate delivery. Catalog listings pumps available from stock is offered.
Page 15 — Item 207

PACKAGED COOLING TOWER.....
story is told by the 20th edition of the simulated volumes in this ad. Information on manufacturer's lines is available.
Pages 16-17 — Item 208

RESIDENTIAL AIR CONDITIONING...
from the consumer's point of view has dictated the design of the quiet performing unit developed by Carrier Corporation, utilizing permanently lubricated ball bearing units from this manufacturer. Bulletin is available.
Page 19 — Item 209

AIR COOLED CONDENSERS.....
are available from this manufacturer in eight sizes up to a 50-ton single unit. Control modulates condenser capacity in accordance with the weather. Information is available.
Page 20 — Item 210

PRACTICAL PIPING LAYOUTS.....
in a 36-page collection of 25 basic piping diagrams is No. 3 in the famous series of books from this manufacturer. It is available only by request on your company letterhead, not by item number.
Page 21 — Item 211

SIMPLIFIED INSTALLATION.....
is a feature of these air cooled, packaged chillers and remote condensing unit assemblies. Each unit is complete, pre-engineered, and packaged. Catalog is available.
Page 22 — Item 212

NEW THERMODYNAMIC TABLES.....
on two important refrigerants are offered in two booklets from this company. They are available only by request on your business letterhead, not by item number.
Page 23 — Item 213

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Circle numbers corresponding to the items and advertisements in which you are interested, print your name and address clearly. Information will be sent directly from manufacturers.

INQUIRY CARD

Circle below item numbers on which you wish catalogs or further information

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
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Title or Job Function .....

Firm .....

Nature of Firm's Business .....

Street .....

City .....**Zone** ....**State** .....

This card is void after June 1, 1958

HEATING PUMPS
meet unusual and exacting conditions, offering custom design at a standard price. Pumps are inexpensive to install, operate and maintain. Bulletin is available.
Page 24 Item 214

RELIABLE VENTILATION
in a package is offered by the manufacturer's belted vent sets. Sets are equally adaptable to indoor or outdoor installations. Bulletin is available.
Page 25 Item 215

PACKAGE BOILER UNITS
are offered in eight sizes, from 18 to 92 hp. Forced draft firing keeps combustion air supply constant. Literature is available.
Pages 26-27 Item 216

VANEAXIAL BLOWERS
power a unique plating tank high temperature exhaust system at Stratford, Conn., plant of Sikorsky Aircraft Division. Manufacturer has equipment that is right for almost any industrial air moving job. Information is available.
Page 28 Item 217

AXIAL ROOF VENTILATOR
gives low cost ventilation with a low silhouette, high efficiency ventilator that is completely accessible from the roof. Information is available.
Pages 30-31 Item 218

COMMERCIAL AIR CONDITIONERS
for single or multiple space installations are now available from this company under a lease plan. Customers need make no capital investment; sales people get payment in full immediately from lease company. Information is available.
Page 32 Item 219

HEAVY OIL BURNER
uses two-stage atomizer to change heavy oil to an aerated fog with the characteristics of a gas, not a spray. Information and specifications are available.
Page 33 Item 220

TEMPERATURE CONTROL SYSTEM
from this manufacturer helps taxpayers for new schools get more money saving advantages in heating installations. Information is available.
Pages 34-35 Item 221

AIR-CONDITIONED BANK
of the Southwest employs over 150 tons of the mnufacturer's seamless steel pipe in its vast air conditioning system. Information is available.
Page 38 Item 222

HIGH-CAPACITY STEAM COILS
are available in standard and non-freezing types. Water coils for use with chilled or hot water. Direct expansion coils equipped with pressure type distributor circuited for minimum refrigerant pressure drop. Information available.
Page 40 Item 223

FUEL OIL HEATER
furnishes optimum solution to the problem of providing adequate oil temperature and eliminating possibility of leakage of fuel oil into the HTW stream is furnished in a single exchanger which provides adequate oil temperature, isolation of HTW circuit from the oil circuit and reduction in space requirements at low initial cost. Inquiries invited.
Page 41 Item 224

PNEUMATIC CONTROL CENTERS
are bringing major savings in heating and cooling costs as well as greatly improved temperature control to buildings of all types and sizes. Information is available.
Pages 42-43 Item 225

PERFECT AIR DIFFUSION
for the new Harry S. Truman Library in Independence, Mo. is insured by draftless air diffusers. Selection manual is available.
Page 44 Item 226

PERFECT AIR DIFFUSION
in the Harry S. Truman Libary is further promoted by quality designed return air grilles. Descriptive catalog is available.
Page 44 Item 227

FLOW CONTROL PROBLEMS
and varying valve requirements are handled by any distributor of this manufacturer. Complete lines of valves are built to provide long range service and savings. Information is available.
Page 45 Item 228

EQUIPMENT PERFORMANCE
as well as delivery dates and user satisfaction of any air conditioning system have a single source of responsibility when components are selected from the manufacturer's line that is designed, engineered, and manufactured to work together. Information is available.
Pages 46-47 Item 229

MOTOR CONTROL
by this manufacturer was used by Chicago's Board of Trade Building for its air conditioning system. Many years of trouble-free service are assured. Catalog is available.
Page 48 Item 230

YEAR-ROUND CONDITIONING
and individual room climate control are offered by these concealed units. They quietly and efficiently heat, cool and dehumidify. Bulletin is available.
Page 49 Item 231

MORE GAS-FIRED BOILERS
are offered by this company in commercial sizes than any one in the industry, assuring a closer sizing of the boiler to load requirements. Information is available.
Page 50 Item 232

PRECISION AIR DISTRIBUTION
from side walls ceases to be a problem when the manufacturer's sidewall diffusers are specified. The company's comfort chart, showing proper relation between air velocities and air temperatures, supplements the diffusers for ideal results. Catalog is available.
Page 51 Item 233

ELECTRIC ROOF VENTILATORS
offer engineers, architects, contractors and users AMCA-rated units that embody sturdiness, high performance ratings and low noise levels. Line catalogs are available.
Page 52 Item 234

CAST IRON GAS BOILERS
match modern design with modern efficiency. Features include easy-fit header and electronic control panel. Information is available.
Page 54 Item 235

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FIRST CLASS PERMIT NO. 33, SEC. 34.9, P. L. & R., NEW YORK, N. Y.

AIR CONDITIONING, HEATING AND VENTILATING
93 WORTH STREET
NEW YORK 13, N. Y.

AD-DIGEST SERVICE

INDUSTRIAL AIR FILTERS..... from this company explode the fiction that removal of odors from the air requires bulky, expensive equipment, necessitating larger fans and motors to overcome resistance. Information is available.
Page 55 Item 236

CLOG-PROOF SEWAGE EJECTOR..... is standard in fine buildings, as Socony Mobile in New York City. More than 12,000 have been installed and not one has clogged. Only liquid reaches the impeller. Information is available.
Page 56 Item 237

ALL-AIR HIGH VELOCITY SYSTEMS.. for new school building or old school renovation are described in company's new school catalog which contains all necessary application and selection data.
Page 57 Item 238

ONE-PIECE PIPE INSULATION..... of the snap-on type is compared with conventional pipe insulation in TEVA (Thermo-Economic Value Analysis) report which is an exclusive service of this company. Information is available.
Page 59 Item 239

IMPULSE STEAM TRAPS..... from this manufacturer are highly recommended in an interview with the chief engineer of a large Eastern meat packing plant. Savings are claimed at 30,000 gallons on fuel oil per year. Booklet on steam trapping is available.
Page 122 Item 240

FLEXIBLE DUCT CONNECTIONS..... are fabricated using a fabric of your choice. Also offered are elbow vanes, air scoops and louvers. Information is available.
Page 124 Item 241

CENTRAL PLANT UNITS..... numbering 23 effectively combat the rapid variations of Oklahoma weather for Kerr's Incorporated by maintaining a comfortable climate throughout the entire building all year. Information is available.
Page 125 Item 242

INDUSTRIAL VENTILATION..... problems are solved in efficient manner by complete line, certified performance, and competitive pricing of manufacturer's air moving equipment. Catalog is available.
Page 126 Item 243

COMPLETELY PACKAGED BOILER... combines reduced overall dimensions with rugged practical boiler construction. Unit is completely packaged and factory fire tested. Bulletin is available.
Page 127 Item 244

BUILDING WATER COSTS..... are cut by $30,000 for air conditioning system in Syracuse, N. Y., through installation of this manufacturer's vertical 25-hp turbine pump. Information is available.
Page 128 Item 245

VENTILATION SYSTEMS..... are simplified when one of the manufacturer's fans is installed. Motor is inside fan, and the fan fits right into the duct. Bulletin is available.
Page 129 Item 246

GAS UNIT HEATERS..... have cost comparable to or lower than that of other types of equipment of equal heating capacity, and this is the total cost. Information is available.
Page 130 Item 247

EXHAUST FANS..... handle 800 deg. F. gases for a large chemical manufacturer. Equipment is available to meet the most exacting application. Information is offered.
Page 131 Item 248

ADJUSTABLE SPROCKET RIM..... with chain guide provides safe, floor level valve operation. Pipe layout is simplified, and any size wheel is fit. Descriptive catalog sheet is available.
Page 132 Item 249

FLEXIBLE HOSE..... is adaptable for all kinds of fume and dust control and ventilation uses. It is durable, lightweight, and easy to install. Information is available.
Page 132 Item 250

SUBMERSIBLE PUMPS..... for flooded basements, septic tanks, and condensate removal in air conditioners feature a switch that never fails. Details are available.
Page 134 Item 251

ICE BANKS..... are designed by this manufacturer to deliver tons of 33 to 34-deg F ice water for recirculation through air cooling coils in air conditioning systems. Designed for use with Freon, methyl chloride, or ammonia, the banks may be added to existing systems for increased capacity. Information is available.
Page 135 Item 252

INSULATION ADHESIVES..... provide excellent coverage, high heat resistance, and easier handling of insulation. A free sample and descriptive catalog are available.
Page 135 Item 253

INDUSTRIAL INCINERATORS..... save hauling charges and pay for themselves in 6 to 12 months. Units are easy to install, efficient to operate. Information is available.
Page 135 Item 254

RADIANT-ACOUSTICAL CEILINGS.... provide complete integration for economy, comfort, and efficiency. Never caused condensation! Folder describes them.
Page 136 Item 255

INSTRUMENTS FOR TEMPERATURE.. as well as pressure and humidity applications from this company have been installed in literally thousands of commercial and industrial projects — routine, special, and classified. Information is available.
Page 136 Item 256

FLOOR DRAINS..... in a selection of over 400 variations assure the exact drain for the job. All drains are made to quality control standards. Catalog is available.
Page 137 Item 257

Circle numbers corresponding to the items and advertisements in which you are interested, print your name and address clearly. Information will be sent directly from manufacturers.

INQUIRY CARD

Circle below item numbers on which you wish catalogs or further information

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Ad-Digest

HYDRAULIC TEST PUMPS..... are designed for testing boilers, condensers, heat exchangers, pressure vessels and pipe lines. Simple construction requires minimum maintenance. Information on pumps is available.
Page 137 Item 258

LINE OF AIR FILTERS..... includes a viscous type, permanent and cleanable for low velocity systems; one that operates at 300 to 500 fpm; and a permanent, cleanable grease filter for range canopies and kitchens. Bulletins are available.
Page 137 Item 259

INSTANTANEOUS HEATERS..... heat 100,000 gallons of water daily for the Schrader Valve Company. A simplified selection chart for the heaters is available.
Page 138 Item 260

AN AIR-SCOOP..... installed in the supply line and connected to the expansion tank can be then forgotten with no call backs, no servicing. Data sheet is available.
Page 139 Item 261

25 INSTALLATIONS..... of this company's air conditioning apparatus have gone into booming Phoenix, Arizona. Company's teams are ready to assist in your engineering problems, too.
Page 140 Item 262

MODULAR BRICK SIZE VENTS..... are the ideal air intake for all air conditioning units. Features of the cast aluminum products are neat appearance, weatherproofness, and economy. Technical data are available.
Page 141 Item 263

AUTOMATIC SHUTTER..... is the most substantial building shutter on the market. The only one with an angle-iron frame, it is noted for durability and long life. Catalog is available.
Page 142 Item 264

MOTORIZED VALVE..... replaces ordinary radiator valve with no plumbing change or shut-down of heating system. Valves are made in all standard pipe and tubing sizes. Information is available.
Page 142 Item 265

PORTABLE PYROMETER..... in a wide selection of thermocouples and extension arms assures adaptation to your needs. Eight scaled ranges are available up to 2000 deg. F. Bulletin is available.
Page 142 Item 266

WATER COOLERS..... are offered for any drinking water requirements. Mechanical push-button and foot pedal controls assure uninterrupted supply. Catalog is available.
Page 143 Item 267

CONDENSATE PUMPS..... are built to give a lifetime of service with only routine maintenance. Specially designed mechanical seals eliminate stuffing boxes, frequent adjustment. Information is available.
Page 143 Item 268

ELECTRIC AIR DUCT HEATERS..... for heating air under forced circulation are efficient, economical. Heaters can be installed easily in round or rectangular ducts and accurately controlled manually or by thermostat. Bulletin available.
Page 144 Item 269

COMBUSTION CHAMBERS..... utilizing the manufacturer's engineered refractories are available in special shapes to meet all individual requirements and specifications. Information is available.
Page 144 Item 270

CONCRETE FASTENERS..... anchor anything permanently. No load is too great, no vibration can loosen these self-drilling expansion anchors. Catalog is available.
Page 144 Item 271

FLEXIBLE DUCT CONNECTORS..... of any type are easily fabricated from handy 25, 50, or 100-ft rolls, available from the manufacturer. Catalog is available.
Page 145 Item 272

AIR CONDITIONING METHOD..... with exact moisture control is more effective because its cooling and heating functions are made completely separate from adding or taking away of moisture. Two bulletins are available.
Page 145 Item 273

CONTINUOUS STRIP DIFFUSERS..... are the only practical means for air curtaining plate glass windows or wall areas to counteract summer heat or winter chill that blends with interior. Can be hidden in lighting coves. Information available.
Page 146 Item 274

BOILER WATER LEVEL CONTROLS... are believed to be the safest as well as simplest devices available. Operating life is almost unlimited. Catalog is available.
Page 146 Item 275

HEAVY DUTY BOILERS..... for every steam or water heating application up to 1.8 million Btu per hr output are found in this manufacturer's line. Information is available.
Page 147 Item 276

ROOM TEMPERATURE CONTROL..... for steam or hot water systems, for modernization or new construction, is attained with this accurate, self-contained modulating controller. Information is available.
Page 148 Item 277

FILTER FACTS..... are informatively presented by this manufacturer of filters engineered to solve filtering problems for air conditioning and ventilating equipment, engines, compressors or any device using air or liquids. Line catalog is available.
Page 149 Item 278

FILTER-DRIER ..... incorporates an activated ceramic desiccant block for micronic filtration with granular desicant for high efficiency drying at low pressure drop. Information is available.
Inside Back Cover Item 279

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NEW YORK 13, N. Y.

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ABSO-DRY PRESSURE SEALED "THEY HISS & TELL"
BRASS END CONNECTIONS— EASIER TO SEAL
HIGH WORKING PRESSURE—500 PSI
LOOK! GRANULAR DESICCANT TOO
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